Mobility as a Service in a multimodal European cross-border Corridor (MyCorridor)

Deliverable 1.1

MyCorridor Use Cases

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MyCorridor

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<td>AML</td>
<td>Anti-Money Laundering</td>
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<tr>
<td>API</td>
<td>Application Programming Interface</td>
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<tr>
<td>BM</td>
<td>Business Model</td>
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<td>C2C-CC</td>
<td>Car 2 Car Communication Consortium</td>
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<tr>
<td>CA</td>
<td>Certification Authorities</td>
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<tr>
<td>CAM</td>
<td>Cooperative Awareness Message</td>
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<tr>
<td>C-ITS</td>
<td>Cooperative Intelligent Transport Systems</td>
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<td>DEMM</td>
<td>Decentralized Environmental Notification Message</td>
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<tr>
<td>DSRC</td>
<td>Dedicated Short Range Communication</td>
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<td>EC</td>
<td>European Commission</td>
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<td>EPF</td>
<td>European Passengers’ Federation</td>
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<td>GDPR</td>
<td>General Data Protection Regulation</td>
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<td>GNSS</td>
<td>Global Navigation Satellite Systems</td>
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<td>HMI</td>
<td>Human Machine Interface</td>
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<tr>
<td>ITS</td>
<td>Intelligent Transport Systems</td>
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<tr>
<td>KPI</td>
<td>Key Performance Indicator</td>
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<td>LSP</td>
<td>Logistics Service Providers</td>
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<td>MaaS</td>
<td>Mobility as a Service</td>
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<tr>
<td>MSP</td>
<td>Mobile Service Provider</td>
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<tr>
<td>OEM</td>
<td>Original Equipment Manufacturer</td>
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<tr>
<td>PDRM</td>
<td>Probe Data Reporting Management</td>
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<tr>
<td>PKI</td>
<td>Public Key Infrastructure</td>
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<tr>
<td>PND</td>
<td>Personal Navigation Devices</td>
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<tr>
<td>POI</td>
<td>Points of Interest</td>
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<td>PPP</td>
<td>Public Private Partnership</td>
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<td>PSD2</td>
<td>Payment Services Directive 2</td>
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<td>RDS-TMC</td>
<td>Radio Data System - Traffic Message Channel</td>
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<td>SBB</td>
<td>Schweizerische Bundesbahnen (Swiss Railway)</td>
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<td>SDO</td>
<td>Standards Developing Organisations</td>
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<td>SLA</td>
<td>Service Level Agreement</td>
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<td>Smart Ticketing Alliance</td>
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<td>SNCF</td>
<td>Société Nationale des Chemins de Fer</td>
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<td>TMC</td>
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<td>Telecommunications Software &amp; Systems Group</td>
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<td>UI</td>
<td>User Interface</td>
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<td>V2I</td>
<td>Vehicle-to-Infrastructure</td>
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Executive Summary

The current Deliverable (D1.1) has been prepared in the context of WP1: “Defining a disruptive MaaS culture” of MyCorridor project. WP1 aims to set the theoretical basis for all the specifications and implementation work of the project that will follow. In specific, WP1 aims:

- To explore traveller behavior and preferences through literature survey, digitally-based mass survey-based data collection and focus groups.
- To explore all mobility alternatives at different MaaS levels in the pan-European context and identify key success and failure factors to be considered within MyCorridor.
- To investigate technological, organizational and business issues related to multimodal services and platforms in order to pave the way for a smooth and successful transition into MaaS.
- To map and categorize MyCorridor mobility services and come up with a set of demonstration Use Cases.

The tasks of WP1 (A1.1 – A1.5) have been designed and executed in a way so as to respond to all the objectives aforementioned, whilst D1.1 has consolidated all outcomes of all tasks in a sound and coherent way in order to come up with the project Use Cases and indicative scenarios of us. In specific:

Chapter 1 introduces the purpose of this document, the anticipated interrelations and the target audience. Chapter 2 reminds the MaaS notion and the MyCorridor placement in that. Chapter 3 describes the user/stakeholder – driven methodological approach that has been defined and applied for the formulation of the project Use Cases and other key side results. Chapter 4 describes in short the MaaS ecosystem, the key stakeholders of its value chain (Government/Authorities, Cities/Regions, MaaS operator/aggregator, Transportation Service Provider (supplier of mobility products), Infomobility, added value and Mobile Service/Technology Providers and Travellers) as well as which are their key and alternative roles in the MaaS value chain. Chapter 5 identifies which are the most important strategic priorities and policy directions in the area that are in favour of MaaS penetration and deployment and in which way. In specific, the ITS Directive and ITS Action Plan, the Public Sector Information (PSI) Directive, the INSPIRE Directive, the Roaming and the GDPR directives, the Action Plan Urban Mobility 2009, the EasyWay Deployment Guidelines, the Smart Ticketing Alliance, the Commission Staff Working Document towards the multimodality roadmap, the EU’s Payment Service Directive 2, the European Data Economy, policies from POLIS and MaaS Alliance, the TM2.0 initiative but also industrial MaaS initiatives and the MaaS visions across the Atlantic are discussed. The section closes with a discussion on how MyCorridor aims to address/comply with them and to which degree.

Chapter 6 summarises the MaaS landscape. In specific, it refers in short to the most popular MaaS or MaaS – like schemes as well as some key research initiatives that are relevant or interrelated to MyCorridor. 9 advanced offerings, 10 single dimension schemes and 5 research initiatives have been analysed. Also, in Chapter 6, an overview and comparison of the MaaS offerings across 6 recognised cooperation stages has been provided, also summarising the modes present in each and the key areas of MyCorridor that they are addressed. In addition, another overview is provided in this Chapter, presenting the MaaS activities per city as well as the key emerging pilot/demonstration outcomes. Additionally, an insight on the most important Business Models, incentives and promotion strategies in the MaaS field and the MyCorridor anticipations in this respect is provided, closing with the MyCorridor placement in the relevant market.

Chapter 7 summarises through literature review what has been recorded so far about travellers’ needs in the MaaS context, complementing them with a series of focus groups and an on-line survey that aimed exactly to the more in-depth insight in them and, in specific, the travellers acceptability towards MaaS,
the justification of it, and the recognition of specific needs, preferences and priorities. Six (6) focus groups took place in Greece (Thessaloniki & Athens), Austria (Salzburg), Czech Republic (Prague), Italy (Rome) and Belgium (Brussels). **44 persons** in total took part in the focus groups conducted. Findings have been consolidated and discussed across key aspects, namely Human experience, Conceptual acceptability, Technology challenges and Legal concerns. The online survey was conducted in order to complement the qualitative outcomes emerging from the focus groups. It aimed at further investigating and capturing more tangible findings regarding MaaS acceptance, traveller behaviour, needs and priorities in a more systematic way that would be easier to reflect in the anticipated implementations. The on-line survey was completed by **142 participants** from different countries and of different age, gender and background. It was promoted through the project web site, social media and the Consortium beneficiaries’ individual networks. Chapter 7 concludes with the key aggregated results for travellers from all sources aforementioned.

In a similar way, **Chapter 8** discusses the needs of the other stakeholders participating in MaaS value chain. The needs and priorities from their perspective but also the expectations from them in the overall MaaS context have been investigated on the basis of literature sources and throughout the Pan-European workshop that was held in the context of MyCorridor project. The **1st Pan-European workshop** of MyCorridor took place on the 9th of February 2018 in London, UK and was attended by **more than 50 stakeholders**. The interactive session, managed through Mentimeter tool ([https://www.mentimeter.com/](https://www.mentimeter.com/)) addressed four key topics, namely MaaS & public sector, MyCorridor Use Cases, Business Models and Towards a Euro-Mobility ticket. As a follow-up activity, **20 participants** completed a more targeted post-workshop on-line survey.

**Chapter 9** discusses the key success and failure factors for MaaS deployment are across 6 key clusters: Human-related, Conceptual, Technological, Organisational, Business-related and Legal. **21** general barriers and **18** general enablers have been identified. Furthermore, it is identified which are the involved stakeholders and how important/relevant is their involvement in each one. Finally, the impact of key external megatrends in MaaS is discussed. The megatrends recognised (so far) are namely: Urbanisation and growing investments in smart cities, Sustainability – Environmental challenges, Demography – global population grown and Travel Trend: Multimodality.

**Chapter 10** identifies the key impact areas of MaaS – and, consequently MyCorridor, and lists the first pool of applicable Key Performance Indicators (KPIs). Using as starting point the MASSiFiE related work, KPIs have been recognised on Individual/user level, Business/organisational level and Societal level with anticipated impacts in Environmental, Economic and Social fields.

**Chapter 11** summarises the requirements as identified through the consolidation of the collected information through a) the literature and the current MaaS landscape (competition), b) the online survey conducted by MyCorridor project, c) the focus groups and d) the feedback during and after the 1st Pan-European MyCorridor workshop. It is recognised which of those requirements, to which degree and how they have been (or will be) taken into account by the Use Cases and MyCorridor overall. This list will be revisited and turn to technical specifications in the context of WP2 work. Overall, **38 requirements** have been consolidated.

**Chapter 12** describes the **15 Use Cases and the indicative scenarios per each**, across the fields defined in Annex 7 template and having consolidated all feedback from the user/stakeholder needs and the market-driven needs recognition phases. The MyCorridor Use Cases are as follows:

**Traveller Use Cases**
- **T1** - User Login/Register/ Authentication
- **T2** - Static & semi-dynamic profiling
- **T3** - Personalised MaaS package configuration, purchase & redemption
T4 - Personalised Info support (added value services – athletic, touristic, cultural, health push personalised notifications)
T5 - Modification/Cancelation
T6 - Traveller feedback
T7 - Loyalty scheme (encompassing incentivisation & rewarding)

Service Providers Use Cases
S1 - Service provider log-in
S2 - Service registration
S3 - Service provider business rules editing

Back-end Use Cases
B1 - Overall Business Rules editing
B2 - Added value synthetic
B3 – Clearance with the traveller and the service providers (e-vouchers)
B4 – Mobility Token Issue and redemption (use/validation)
B5 – Interactive Traffic Management Plan

Chapter 13 discusses the current MyCorridor services inventory (encompassing 64 individual services) that will be enriched during the project (provided in Annex 6 itself), whilst Chapter 14 concludes the Deliverable with the next steps that will follow its completion.

Finally, a series of Annexes are attached at the end of the document. Annex 1 provides the Focus Group Briefing Document for Facilitators, Annex 2 provides the form used for the on-line MaaS survey, Annex 3 provides the Pan-European workshop presentation that was used during the interaction session, Annex 4 provides the form that was used for the post-workshop on-line feedback, Annex 5 provides the UML diagrams that reflect the project Use Cases of Chapter 12, Annex 6 provides the current inventory of MyCorridor one-stop-shop services, Annex 7 the template used for the Use Cases description and Annex 8 some key terminology that will be enriched in the project lifespan.

The success criteria for WP1 have been reached as follows:
- At least 30 relevant literature sources thoroughly surveyed.
  o MyCorridor went through at least 35 sources in the context of the literature surveys conducted in WP1.
- At least 10 use cases agreed for implementation.
  o 15 main Use Cases have been fully described and prioritised.
- At least 15 different MaaS schemes and multimodal platforms will be thoroughly analysed.
  o 9 advanced offerings, 10 single dimension schemes and 5 research initiatives have been analysed.
- At least 60 stakeholders to participate in 6 focus group discussions across project pilot sites.
  o 44 persons in total took part in the focus groups and another 50 participants attended the Pan-European workshop. Though the exact target of 60 persons was not reached in the focus groups, it is considered minor by the project in the sense that the findings would not vary a lot and, in reality, focus groups in order to be successful and realise valuable in-depth discussions should not target a big audience.
1 Introduction

1.1 Purpose of the document

This deliverable is prepared in the context of WP1: “Defining a disruptive MaaS culture” and summarises all its outcomes, the most crucial of which are the Use Cases (and indicative scenarios) of the project that are user and market driven – meaning they are based on all the different stakeholders’ needs, preferences and priorities but are also in reference to the existing market and current trends and accomplishments as well as the corresponding policies and strategic priorities.

“User” in MaaS and more specifically in MyCorridor is noted in reality any type of stakeholder that is playing a specific role in MaaS (and related schemes/solutions) establishment and operation. According to MyCorridor ecosystem definition, users are namely the Government/Authorities, the Cities/Regions, the Mobility/MaaS operator/aggregator/Issuer, the Transportation Service Provider/Operator (supplier of mobility products), the Infomobility, added value and Mobile Service / Technology Providers and the Travellers.

Their role is detailed in section 4 of this document, their needs, priorities and preferences are described in sections 7 and 8 of the deliverable, whereas the relevant market is described in section 6 of the document.

Upon a specific methodological approach defined (and described in section 3 of this deliverable), the Use Cases of MyCorridor, being the final goal and reflecting the MyCorridor solution conceptualisation, have emerged and are described in detail in section 12 of the document. The project’s Use Cases are going to serve as the reference point for the later design, implementation and demonstration/testing work that will follow.

1.2 Intended audience

The nature of this Deliverable is public, meaning that it will be finally (upon approval by the EC) available through the web site of the project (“Library” section). Due to its various content layers, the interested audience may vary respectively, as follows:

- **Internally to the project:**
  - MyCorridor developers, encompassing all those dealing with the specifications and implementation work of the one-stop-shop (WP2 & WP3), the services to be integrated (WP4) and the personalisation work of WP5, for whom the competitive market and the definition of the Use Cases and their justification from the stakeholders’ needs and priorities side are crucial for their work.
  - MyCorridor partners dealing with the business modelling and exploitation aspects of the project (in the context of WP7 and WP8) that need to take into account the priorities and restrictions imposed by the different stakeholders, as a basis for their respective work, as well as the competitive market and the approaches adopted in similar schemes.
  - MyCorridor partners dealing with demonstration and testing (in the context of WP6) that will, in first place, use a) the Use Cases and indicative interaction flow scenarios as the basis for the definition of the evaluation and experimental framework and b) the KPI’s pool identified herein as reference for the impact assessment framework that needs to be established.

- **Externally to the project:**
1.3 Interrelations

The current Deliverable encompasses and critically consolidates finally in the form of Use Cases the research outcomes of WP1 overall. The stakeholders needs/preferences/priorities as well as the State of the Art in the MaaS field may be individually beneficial as feedback in a series of Activities of other WPs, such as in WP7: "Business models, incentives and legal issues" or WP5: "Personalised, context-aware and inclusive UI’s". Still, the key interrelation stands in the Use Cases of the project, serving as the key reference point for the whole project from their moment of their release onwards. In specific, the Use Cases will constitute the baseline for the System Architecture and specifications of WP2 (and the later development in WP3: "One stop implementation & modules") as well as for the Pilot scenarios in WP6: "Pilot realisation and impact assessment". For sure, and due to the iterative nature as depicted in the methodology section of the Deliverable (section 2), the Use Cases may slightly change as an outcome of the revisions that will emerge during the pilot rounds. Also, the first inventory of MyCorridor services included herein will set the basis for WP4: "MyCorridor MaaS" work. Any updates will be reported respectively in D2.2 for M24 and will also continuously feed the Use Case guide document that will live individually in the project (after the final release of the Use Cases).

2 MaaS & MyCorridor

Mobility as a Service (MaaS) is defined by MaaS Alliance as the integration of various forms of transport services into a single mobility service accessible on demand. The key concept of MaaS is to place end-users (be it travellers or goods) at the very centre of transport service, in order to provide them with tailor-made mobility solutions that originate from their individual needs. This concept means that a bundle of personalised, flexible, up-to-date travel service options will be available to end users to ensure easy access to the most appropriate transport mode or service.

The notion of MaaS has emerged as a result of the growing transportation needs, the increasing population and the growing demand of citizens for integrated services. Further to that, the rapid urbanization, the rise of disruptive technologies and big data, the growing concern for the environment and sociocultural shift and habits of millennials add to the need for a new model that is flexible, personalised, communicative and responsive. The Eurobarometer Survey conducted in 2014 showed that good infrastructure, better connections, and cheaper tickets are the main concerns of EU citizens. The survey also revealed that convenience is by far the main reason for choosing a specific means of transportation for everyday and long journeys (both 61%), followed by speed (respectively 31% and 41%) and price (12% and 18%).

At the centre of MaaS are mobile devices and the Internet of Things, which provides users with real time information on transport issues. The use of technology will bring about a new era in transport, where
transport modes will be powered by technology and will be safer and autonomous, ready to cater for individual needs of travellers.

A number of MaaS schemes have emerged in Europe, the most important and successful ones being the following: WhimApp (Finland), UbiGo (Sweden), SMILE (Austria), HannoverMobile (Germany) and EMMA (France). End users belong to a variety of ages and have different travel habits. However, the users of the first MaaS schemes are mostly everyday travellers who commute to their work and are users of different transport modes.

MyCorridor aims to develop the technological and business platform, which will enable technologies, applications, business models, legal and operational schemes and travel behaviour adaptation and promotion strategies to make MaaS a sustainable reality, seamlessly integrating public and private transportation means as needed, into a cross-border travel chain, without owing any of them! MyCorridor's unique selling point lies within its cross border services and the element of personalization that will provide travellers with a seamless experience within the EU.

MyCorridor mission is to facilitate sustainable travel in urban and interurban areas and across borders. This will be achieved by replacing private vehicle ownership with private vehicle use, as just one element in an integrated/multi-modal MaaS chain, through the provision of an innovative platform, based on mature ITS technology, that will combine connected traffic management and multi modal services to facilitate modal shift. MyCorridor's objectives are to propose a technological and business MaaS solution which will cover interoperability, data sharing, legislative, business related and traveller behavior issues and barriers in order to enable the emergence of a new business actor across Europe; that of a Mobility Services Aggregator.

To prove the above mentioned paradigm change, a number of European sites will participate, performing long distance and cross border Pilots in a corridor of 6 European countries, starting from the South (Greece, Italy) through to Central Europe (Austria, Germany, Netherlands) and Eastern Europe (Czech Republic).

The basis of the MyCorridor project is the TM 2.0 platform (i.e. as an enabler of MaaS), and, therefore, the starting point are those mobility services related to the interactive traffic management vision of the "vehicle world". It aims to extend the current capability of TM 2.0 by integrating in a single platform pan-European data sets, able to offer urban and interurban services that are multimodal, seamless, flexible, reliable, user-friendly, all-inclusive, cost-effective and environmentally sustainable.

MyCorridor, integrating in its one-stop-shop traffic management services, infomobility and added value services, vehicle related services, trip planning and interfaces to PT will build and sustain a network of MaaS stakeholders which will be actively involved in evaluation, dissemination and should be considered as early adopters of the proposed solution.

The consortium of MyCorridor encompasses multi-disciplinary partners to ensure the research and work conducted has a well-rounded approach. Partners include: 2 key industrial Partners (SWARCO, Tom-Tom), 7 dynamic SME's in the mobility market (SWARCO Hellas, CHAPS, WINGS, MAPTM, AMCO, VivaWallet, HaCon), 1 mobility agency (RSM), 1 ITS association (TTS), 4 Research performers (UNEW, CERTH, UPAT, SRFG), 1 multinational Legal Firm with specialisation in novel mobility scheme structuring (OC) and IRU which will act as the liaison to MaaS Alliance.
3 Methodological approach towards user-driven Use Cases

The overall process that leads to the development of the Use Cases entailed a number of steps to collect current market information, assess factors and players and determine the traits needed for MyCorridor Use Cases. The following figure reflects the user-driven approach denoting also the WP1 activities where the respective work items were conducted.

More specifically, the approach begins by defining Mobility as a Service and clarifying the position of MyCorridor within MaaS (Section 2). Then, a first registration of the MaaS ecosystem is performed so as to determine the stakeholders and the different disciplines and clusters that participate in it (Section 4). To properly comprehend and depict the MaaS ecosystem and how MyCorridor is related to it, all (if any) strategic initiatives, priorities and policies are studied so as to determine how authorities, organisations, the EU and private partnerships view MaaS (Section 5).

Moreover, an analysis of the MaaS landscape follows in which the market is analysed, research projects are summarised and existing/emerging business models, incentives and promotion strategies in the field are studied to understand how MaaS has entered the market and what steps have been taken (Section 6). As part of the market analysis, the most and less advanced MaaS offerings are described. Research initiatives that deal with MaaS are also included in this section. Using the information collected from the market analysis and the research projects, an overview of the MaaS offerings is presented, followed by an analysis of the first outcomes from MaaS piloting in cities. Then, the existing and potential business models are analysed based on already applied MaaS schemes and on existing literature, followed by incentives and promotion strategies that have been used so far to communicate...
MaaS to their target audience. The presentation of the MaaS landscape closes with the anticipated placement of MyCorridor in the market.

Having determined the stakeholders in Section 4, the document focuses on travellers to explore their needs, preferences, habits and profiles (Section 7). To achieve this, a literature survey has been conducted to determine the profile of the travellers and understand their needs and priorities. To further reinforce the literature survey results, focus groups are conducted in EU partner cities and an online questionnaire is circulated to travellers across the EU. The results are then aggregated and are used to guide MyCorridor towards addressing those needs.

At the same time, in order to have insights on other stakeholders’ needs in MaaS overall and MyCorridor in specific, a literature survey, internal interviews with experts, a Pan-European workshop and a post-feedback survey have been conducted (Section 8). The results of all three are consolidated and used to guide MyCorridor towards addressing the other (than travellers) stakeholder’s needs. The next step focused on the determining the key success and failure factors for MaaS deployment (Section 9). The barriers and enablers are examined while the impact of external trends is explored. After having analysed the above, the impact of MaaS is evaluated (Section 10). For this purpose, impact assessments of previous projects are used, assisting at the same time towards determining Key Performance Indicators (KPI’s) for MaaS success. The above information was then used to determine the user and market driver requirements (section 11) that guided the final issue of the Use Cases and scenarios that are presented, being the result of all the above mentioned steps in Section 12. Finally, in Section 13, the first pool of MyCorridor services that will be aggregated in one stop shop is being provided and discussed.

It is important to stress here the iterative nature of the methodology as the Use Cases of the project will be iteratively validated through the 2 evaluation rounds in WP6 that may redefine them up to a certain degree.

4 The MaaS Ecosystem

A MaaS ecosystem is by default complex and multidisciplinary as it brings together partners, players, participants and providers from different business segments in order to reach a value proposition and deliver the MaaS service to customers. To further explore enablers and barriers of MaaS growth, it is essential to understand the participants’ profile, their pains and gains as well as the relationships between the stakeholders, technologies and capabilities involved in the MaaS growth. The key elements of the MaaS business architecture can be described with the following four domains, according to the UK’s Transport System Catapult report [78].

- **Consumer** – describes what various customer segments will value from using MaaS.
- **Business** – describes business drivers for risk and investment.
- **Technology and Information** – scoping the technology and data requirements needed to support MaaS.
- **Policy and Regulation** – scoping the policy areas that could enable MaaS.

These four domains can be considered as the foundations for the MaaS ecosystem and based on these domains, stakeholders, barriers and enablers can be determined.
There is no doubt that stakeholder involvement is complex in emerging MaaS schemes and concepts. It is also true that from country to country, the stakeholders’ roles may change. Obviously countries have different experiences of MaaS and are in various stages of MaaS development, implementation and organisation, which influence their perspectives. There are still hardly any international MaaS (related) services available that provide common ticketing and multimodal traveller information at least on a cross-border level. With this respect MaaS is currently a regional and national mobility service phenomenon although it is expected to expand internationally in the near future.

The creation of MaaS services requires new ways of collaboration, whether it is local, national or international. One potential barrier for international MaaS is a lack of cooperation on organizational and technical levels between different national and international transport organizations.

This points out the importance of bringing in different perspectives from multiple nations and diverse stakeholders when tackling a fundamental issue such as mobility and the development of MaaS in and across Europe.

Starting from the classification proposed by the MAASiFi project [23] and consolidating further, the MaaS ecosystem as currently perceived by MyCorridor is reflected in the following table.

<table>
<thead>
<tr>
<th>MaaS stakeholder cluster</th>
<th>Indicative stakeholders</th>
<th>Stakeholders profile/responsibilities</th>
</tr>
</thead>
</table>
| Government/Authorities  | • Ministry of transportation
• Transport agency
• Road administration
• Transport safety agency/authority | • Legislator;
• Enable testing and pilots through legislation;
• Finance infrastructure investments;
• Implement transport policies, strategy and investments;
• Create (long-term) plans and guidelines for national development of transport services;
• Management of national transport infrastructure;
• Issue permits; regulations; prepares legal rules regarding the transport sector. |
| Cities/Regions           | • Regional/local transport agency
• The city and city planning (technical, traffic, ITS) department
• Tourist agency or department | • Plan, organise and manage public transport;
• Provide locations of stations and stops;
• Strategic urban and city planning;
• Transportation and traffic planning;
• Representing the local infrastructure;
• Traffic management;
• Operation of systems. |
<table>
<thead>
<tr>
<th>MaaS Ecosystem stakeholder cluster</th>
<th>Indicative stakeholders</th>
<th>Stakeholders profile/ responsibilities</th>
</tr>
</thead>
</table>
| Mobility/MaaS operator or MaaS aggregator or Maas Issuer (the term MaaS Aggregator will be used from now on in the current document) | - MaaS company  
- Traffic Management or City agency  
- Public transport operator  
- PPP  
- E – marketplace business entity  
- An alliance of mobility operators, etc. | - Combines the transport services (mobility products), infomobility services and other ICT services into a single application.  
- Provides personalised travel solutions.  
- Responsible for customer service and user experience  
- Basically a business role; could be coupled with a technical role.  
- Could be one entity, an alliance of entities or roaming businesses following the telecom world paradigm. As seen in previous column, this role could be played – depending the business model – by various entities. |
| Transportation Service Provider/Operator (supplier of mobility products) | - Public transport operators (all modes)  
- Vehicle (car/bike/...) sharing/pooling/rental service provider (public or private)  
- Parking operators  
- Road operators (tolls)  
- Taxi operators  
- Coach buses operators  
- Traffic Management operator | - Transport operator providing schedules, fares as covered by Ticketing, offer fares and real-time information, vehicle information, booking information, availability, locations (e.g. bikes and docking stations).  
- Multi modal or road management.  
- Running ITS applications for management, control and passenger information purposes.  
- Could provide also transport content (i.e. drivers and rides database). |
| Infomobility, added value and Mobile Service / Technology providers (for convenience, the shortened term to be used will be Mobile Service Providers from now on) | - Infomobility services providers  
- Dynamic navigation service providers  
- Mobile application providers  
- Telecom providers  
- Financial services providers  
- Trusted 3rd parties  
- Technology (ICT, ITS) providers  
- Other/Local MaaS aggregators | - Provide infomobility related services (i.e. information services, value-added services, etc.).  
- Provides key enabling technology and services (e.g. mobile ticketing, payment) and ICT infrastructure.  
- Providing ITS infrastructure. |
| Travellers | - All transport users/ travellers consuming MaaS, including pedestrians, cyclists, public transport customers, car drivers but also vulnerable to exclusion | - Tailored MaaS consumers. |
The MaaS ecosystem and the specific business roles as will be assumed in MyCorridor will be revisited and elaborated in the context of WP7: “Business models, incentives and legal issues”.

5 Strategic priorities and policies

It seems that MaaS solutions have huge potential to support several targets of European transport goals presented e.g. in the Transport White Paper [16]. More specifically, in its Transport White Paper, the EU aims to establish the framework for a European multimodal transport information, management and payment system, by 2020. The framework will include the conditions necessary to develop and use intelligent systems for interoperable and multimodal scheduling, information, online reservation systems and smart ticketing, in order to provide seamless door-to-door mobility. The framework also refers to the need for online information and electronic booking and payment systems that will integrate all means of transport so that they facilitate multimodal travel. On closer examination, MaaS is basically based on three different pillars – information, management and payment – where each one adds an additional layer of complexity. The ‘information’ part is more integrated than the fields of payment or ticketing. To ensure efficient management of reliable real-time information is one of the basic prerequisites. A lot of different players from different modes with different (commercial) interests and business models are involved. Payment systems play an integral role in MaaS adoption by the user, with ease of use and security of transactions being at the core of their development.

Currently, numerous individual solutions exist on a local, regional or national level. It is a very dynamic field, but services usually only cover certain geographic areas and data availability is often limited due to proprietary solutions by established operators.

So, at the end, it rather seems that the most viable solution would not to have one single MaaS system but rather a combination of systems linked to each other. This could be a feasible way for emerging MaaS schemes and multimodal platforms to offer the necessary services complementing each other.

In addition, the emerging MaaS activities are supported/addressed by a number of European policy initiatives and measures for example:

**ITS Directive and ITS Action Plan**

In 2008 the ITS Action Plan was adopted to accelerate deployment and use of ITS in road transport as well as interfaces to other modes and also provided targeted measures (including the proposal for an ITS Directive). The ITS Directive ([Directive 2010/40/EU] [19]) was adopted in 2010 to support and speed up the deployment of innovative transport technologies and coordinated implementation of interoperable and seamless ITS schemes across Europe, while giving the Member States the opportunity to decide which systems to invest in. Therefore, the EC has to adopt specifications (i.e. functional, technical, organisational or service provisions) within 3 years, with travel information, eCall emergency system and intelligent truck parking as first priorities. The most relevant priority actions for MaaS are (a) the provision of EU-wide multimodal travel information services; (b) the provision of EU-wide real-time traffic information services; and (c) data and procedures for the provision, where possible, of road safety related minimum universal traffic information free of charge to users.
Public Sector Information (PSI) Directive
The Directive 2003/98/EC [17] (Public Sector Information (PSI) Directive) provides a common legal legislative framework on the re-use of public sector information that encourages EU member states to make as much public sector information available for re-use as possible. The directive was adopted on the 17th November 2003 and entered into force at the end of December 2003. In May 2008 the directive was fully implemented in all 27 Member States.

A revision of the PSI Directive has been adopted in 2013 and introduced a genuine right to reuse all content that can be accessed under national access to documents laws, among other things (limits the charges applied to marginal costs, extends the application area of the Directive to certain cultural institutions (libraries, museums, archives, etc.). Member States should have finished transpose the provisions into national law.

INSPIRE Directive
The INSPIRE Directive (2007/2/EC) [18] came into force in May 2007 and deals, amongst others, with collection and publication of geographical information on transport network by public authorities. It will be implemented in several stages and the full implementation needs to be finished by 2019. The goal is to develop a European Union spatial data infrastructure, which will help in cross-border policy-making, encourage sharing of environmental spatial information between public sector organizations and support public access to spatial information across Europe.

Roaming (Connected Continent legislative package)
In 2007, EU roaming rules addressed roaming prices. The "Eurotariff" set maximum prices for phone calls (made and received), texts and downloading data while abroad, which apply to all consumers (unless they opt for special packages). These rules are periodically reviewed and reformed, with further reductions in maximum permissible prices and automatic protections against excessive roaming charges [14] (Digital Single Market, 2017).

In April 2014, the European Parliament voted to end roaming charges by the end of 2015, which supports the regulation “Connected Continent” proposed by the EC in September 2013 that aims to achieve a telecoms single market by elimination of roaming charges, guaranteeing an open Internet for all, enhancing transparency for customers in their contracts, and easing the switch of providers.

Privacy and security (General Data Protection Regulation and the Data Protection Directive)
In March 2014, the European Parliament voted in favour of the European Commission’s data protection reform proposals in both, the General Data Protection Regulation and the Data Protection Directive. The reform should help restore trust by strengthening citizens’ rights, putting people back in control over their personal data, creating more confidence about how personal data is treated (in particularly online), ensuring privacy-friendly default settings and establishing a right to be forgotten, but also facilitate for businesses to operate and innovate in the EU’s Single Market.

EU Payment Services Directive 2 (PSD2)
The EU's Payment Services Directive 2 ("PSD2" - https://eespa.eu/glossary/payment-services-directive-2-psd2/) is an EU Directive (2015/2366/EU) that is based on the previous legislative framework that PSD1 introduced and aims to facilitate innovation, competition and efficiency. PSD2 focuses on the rise of payment-related companies (FinTech) and works towards standardising, integrating and improving payment efficiency in the EU, without compromising customer protection and transaction security. PSD2 sets a level playing field for all payment service providers without compromising customer protection and transaction security. Further to that, PSD2 allows customers (be it individual consumers or businesses) to use third-party providers to manage their payments. Banking institutions are now obligated to comply with PSD2 and provide the third-party providers with
information and access to their customers’ accounts. This means that financial and payment services are now an open market for new actors to participate in and more services to provide to consumers.

Action Plan Urban Mobility 2009
In September 2009, the Action Plan [15] on urban mobility, which proposes 20 measures that should support local, regional and national authorities in reaching their sustainable urban mobility goals was adopted by the EC. Action 6 deals with “Improving travel information”, in particular the provision of travel information via different media, support of the development of national and regional multimodal journey planners and establishment of links between the existing ones. The overall aim is to provide a public portal for public transport information on EU level with focus on the main nodes of the TEN-T network and their local and regional connections.

EasyWay Deployment Guidelines
EasyWay project experts and practitioners proposed the “Deployment Guidelines on harmonisation and interoperability of ITS deployment in Europe”. The deployment guidelines cover areas of Traveller Information Services, Traffic Management Services, Freight and Logistics Services, while the supporting guidelines deal with Operating Environments, Variable Message Signs harmonisation and Data Exchanges – DATEX II and were peer reviewed by international domain experts and validated by the participating Member States Partners of EasyWay. They are not legally binding, but a certain level of strictness in compliance is required to reach the target of the EasyWay Deployment Guidelines. In addition, criteria have been defined that have to be fulfilled in order to claim the overall compliance with the guideline [7].

Smart Ticketing Alliance (STA)
The Smart Ticketing Alliance officially launched in June 2014. The founding members are ITSO Ltd., VDV-KA-KG, CNA, AFIMB and UITP. It aims to establish global ticketing interoperability for the public transport sector [66]. The major goals are a) to foster cooperation between national and regional Smart Ticketing schemes; b) to establish interoperable Smart Ticketing, trust schemes, specifications and certification; c) to develop, agree and publish the requirements (functional and technical) for smart ticketing interoperability; and d) to promote interoperability in Smart Ticketing through the cooperation with other European and international institutions.

Commission Staff Working Document: Towards a roadmap for delivering EU-wide multimodal travel information, planning and ticketing services
The commission staff working document (SWD (2014) 194 final) deals with EU-wide multimodal travel information, planning and ticketing services. After illustrating the key issues within the introduction, the policy context and an overview of the fragmented landscape, the document presents the challenges and the barriers to overcome as well as the way forward and an indicative timeline.

European Data Economy
In January 2017, the European Commission has arranged a ‘Communication on Building a European Data Economy’, fostering a wide-range stakeholder dialogue on the issues of movement of free data, in particular dealing with data access and transfer, interoperability and liability. In this respect, a Staff Working Document was published by the European Commission discussing new data policy frameworks and requirements to be implemented accordingly. Some key interventions described in the communication document are providing stakeholder communities and organisations with support to make use of common data and service standards and foster the provision of common machine-readable formats together with making use of access for public and scientific purposes of data and services.

POLIS Discussion paper
According to the Polis Discussion Paper [62Error! Reference source not found.], Polis members have come together to gain clarity on what MaaS is and what value it can add to cities in terms of citizen behaviour, congestion problems, technology and resources. More specifically, by providing easy access to personal transport services (car hire companies, car-sharing clubs and taxis), advocates claim that MaaS is expected to significantly reduce the need to use a car. Customers will be more inclined to use public transport and potentially to walk more or use a bicycle (at least to reach a public transport stop), thus using a wider range of transport modes (multimodal) and different modes for a trip (intermodal).

Furthermore, for many Polis members, MaaS holds potential to make better use of existing transport services and resources by offering customers access to other types of existing services, such as personal or shared taxis or other forms of demand responsive transport.

Also, the user centric approach of MaaS could allow the development of sustainable transport solutions for all citizens, especially those who may find it difficult to use traditional public transport, such as the elderly and the disabled. Mobility provision is not only a fundamental right but also meets social and economic goals – it is widely acknowledged that keeping people active increases their physical and mental well-being.

Polis members express a number of concerns that need to be addressed. More specifically, it is essential to define what the best role of the transport authority is in the MaaS environment and find the right public-private sector balance for transport service planning/booking/payment. Further to that, understanding the business model and who will pay is important. Also, it is crucial to further understand the impact of MaaS on travel behaviour in order to ensure traveller behaviour changes towards better habits. Finally, they express a concern in user focus of MaaS, as it should offer the opportunity to build a transport system that responds to individual needs, including those with limited transport access, but always ensure these services equally respond to wider societal and transport policy goals.

**MaaS Alliance**
The Mobility as a Service (MaaS) Alliance (https://maas-alliance.eu/) is a public-private partnership creating the foundations for a common approach to MaaS, unlocking the economies of scale needed for successful implementation and take-up of MaaS in Europe and beyond. The main goal is to facilitate a single, open market and full deployment of MaaS services.

The MaaS Alliance has more than 30 members and partners from representing the views of different transport-related industries, public authorities, academia and research. IRU, partner in the MyCorridor project, is one of the founding members of the MaaS Alliance, and is involved in alliance’s working groups on users and rules and technical and standards. IRU’s role is to act as a liaison and deliver the project learnings to a wider audience. IRU actively participates at periodical meetings of the MaaS Alliance, and to other events organised or supported by the alliance.

**Industrial Initiatives**
A strong indicator of mobility trends and changes that are expected to come is the vivid interest of automakers and industrial partners. More specifically, a bright example is the recent partnership [56] between BMW and Daimler, who aim to compete with Uber, Lyft and other mobility services providers by joining their forces towards becoming the largest mobility services provider. The services they will provide are clustered into 5 areas: car-sharing, ride-hailing, parking, electric vehicle charging and multimodal, to cover the on-demand ordering and payment. Other industrial players have also made significant steps towards mobility services [76]. In Gothenburg, Sweden, Volvo has been working on the integration of different mobility services while Ford Motor Co. has already launched a San Francisco-
based shuttle-on-demand service, reviewing the company's mission towards being "a mobility company, rather than an automotive company", as stated by Ford CEO.

**MaaS across the Atlantic – Beyond Traffic 2045**

Mobility as a Service is in the centre of attention in the U.S.A. as well, as the U.S. government has created a 2045 Vision "Beyond Traffic" [80] to look into the latest data and determine the trends and options available for the development of the transportation system, where multimodal systems are a key participant. Further to that, the U.S. Department of Transportation is processing the right steps to determine the policies that will promote the adoption of new technologies, create a government system that incentivises innovation, reduces regulatory barriers and promote technology transfer. The previously mentioned will bring about economic development, promote employment and will allow the increasing American population access to better services.

**TM2.0 initiative**

MaaS, through its ability to allow constant travel capabilities within a geographic region, can be considered a tool for building sustainable communities across their three pillars: environment, quality of life and social welfare. The traffic management industry offers well-proven ITS solutions for improving traffic flow and safety using a large diversity of sensors along the roads. Traditional traffic data collection, monitoring and control represent mature technologies with clear business models. Still, an efficient Traffic Management integration into multimodal MaaS has not been even attempted. The concept of Traffic Management 2.0 (TM2.0 - http://tm20.org/), builds upon the deployment of connected vehicles and travellers in order to achieve convergence of mobility services and traffic management, combining actions of the individual travellers with the collective mobility objectives.

TM2.0 stands for a new proven collaborative concept for Traffic Management and Control, in which the travellers and goods, through the use of new technologies and sensors, become entirely part of the data supply chain. It offers great new opportunities for Traffic Management and Control making it, on one side, cheaper and more efficient for the road operators, and, on the other side, more custom, friendly and acceptable for the travellers. This is done combining effectively data collected by the infrastructure and from the mobility services in the vehicles and smartphones. Current navigation systems in the vehicles use traffic information to provide individual route advices to the drivers, missing however the information related to traffic circulation strategies, traffic regulations or prioritized routes put in place by the TMCs. This is especially the case when extraordinary events are in place (planned or unplanned), such as important sport or cultural events, demonstrations, constructions or public transport strikes, but also when specific plans need to be enforced, e.g. in cases of smog warnings, evacuation alerts, or low-emission zones. Therefore, according to the vision of TM2.0, the future of traffic management is to combine intelligently the individual driver objectives (individual users' optimization) together with network wide management strategies (system optimization and equilibrium) in a win-win scenario.

As such, TM2.0 is considered by MyCorridor an enabler for MaaS and, as such, it aims to encompass TM2.0 example services in its one-stop-shop, including in this way in its value chain the traffic management operators.

MyCorridor original targets and anticipated work programme stands in compliance with the aforementioned strategic priorities and policies. MyCorridor aims to propose an integrated solution that tackles multimodality (in information, management and payment layers) as noted in the Transport White Paper working on cross-border basis to achieve seamless door-to-door mobility. It takes into account traffic management goals at local and regional level, and transforms 'Management' into "Service"; the very essence of TM2.0 platform's ambition. At the same time, though aiming to provide an integrated MaaS solution, through the open architecture that will implement will allow extensibility in all dimensions, enabling the “Aggregator to Aggregator” function (anticipated extension of MyCorridor positioning aggregator as another advanced service provider) that materialises in reality the
recognised fact that different MaaS schemes/solutions have to be able to interface each other and work in an interoperable framework; this framework is well consolidated within the existing EU’s policies for telecommunication roaming and single European Data Economy, which have been analysed already. In specific, as promoted by the European Data Economy Directive, MyCorridor will make use of APIs that can serve as safe entry ports for constructive use of data held by companies. The use of APIs will facilitate the integration of data coming from different sources and the analysis of these datasets as a whole and not in silos. In addition, towards data portability and interoperability, open standards will be used (e.g. JSON format).

Interfaces to public transport sector are also anticipated in this context (as promoted by the PSI Directive), whereas data privacy and security is a core axis of the specifications and implementation work carefully tackled in the project DMP [4]. In the context of the Action Plan on Urban Mobility and the needs to “improve travel information”, MyCorridor will integrate a hybrid trip planner that will build upon MyCorridor beneficiaries national/regional trip planners and open source ones leaving the room for replacement by upgraded/more advances solutions whenever available.

The traffic management services included in the scope of MyCorridor MaaS scenarios have been validated against TM2.0 as well as C-ITS use cases. The main objective within MyCorridor is to migrate from conventional road infrastructure oriented control to service oriented and multimodal traffic management strategies.

Interoperability and security is tackled in a specific Activity of MyCorridor Workprogramme (A2.3), while the EasyWay Deployment Guidelines (i.e. Datex II) have been already taken into consideration for the services integration at and across sites (A4.5), especially for the Traffic Management Services cluster.

Though integrated ticketing is out of MyCorridor scope and while also MyCorridor operates in a MaaS concept that goes beyond Public Sector and the specific targets of the Smart Ticketing Alliance (STA), MyCorridor aims to design and implement the appropriate services required for the connection of MyCorridor platform with the underlying back-office systems of the service operators (of public sector or not) in order to allow a feasible seamless operation up to the validation layer (Activity 3.6). Payment will be operated by a certified entity (VivaWallet) and according to PSD2.

Finally, through its members, MyCorridor has provided feedback to the POLIS MaaS discussion paper with which is in compliance, especially regarding the need for a user-centric approach for MaaS – which is the one followed in MyCorridor. In addition, the concerns posed therein (i.e. regarding the balanced participation of the private and public sector) will be taken into account for the business modelling part.

Finally, through IRU being an active member of MaaS Alliance, MyCorridor is ensuring that is following the most valid and recent advancements in terms of guidelines, needs and design specifications of its solution.

## 6 Maas Landscape

In the following chapter we present selected related services around the world where MaaS notion is present. Per each MaaS solution below, Development and partnership, Service Model and Benefits are summarised (whenever information was available/accessible).

The most advanced MaaS offerings available are discussed in the section 6.1, whilst other services that are not equally integrated from the MaaS perspective, but could prove to be valuable participating
services and are implementing MaaS in some level are discussed in section 6.2. Finally, research projects tackling MaaS are discussed in section 6.3.

6.1 The most advanced MaaS offerings

The most advanced MaaS offerings in the market include tailored mobility packages, which means that the customers pay for mobility much in the same way as they would pay for a telecom package with a fixed monthly cost covering the use of different mobility products across different transport modes.

6.1.1 UbiGo

UbiGo ([www.ubigo.se/](http://www.ubigo.se/)) is a one stop e-shop for travellers to buy their monthly travel needs, offering simplicity of service and security of information. The aim was to develop and test an innovative service that makes it easier and rewarding to use sustainable modes of transport in urban areas [30].

![Figure 2: UbiGo user interface on smartphone, Fluidtime.](image)

**Development and partnership:** UbiGo was developed and tested in 2014 in Gothenburg, Sweden, as part of the two-year project Go:smart, led by Lindholmen science park and funded by Vinnova (the Swedish Innovation Agency). Project partners include: Arby Communication, the City of Gothenburg, Chalmers University of Technology, Lindholmen Science Park, Mistra Urban Future, Move About, Payex Finance, Region Västra Götaland, the Swedish Transport Administration, Tyrrens, Västtrafik, Viktorija Swedish ICT, Volvo Buses, and Volvo IT/Commute Greener. The platform provider for UbiGo was Fluidtime. Suppliers during the test were Västtrafik (public transport), Sunfleet (car sharing service), Hertz (Rental cars), TaxiKurir (taxi) and JCDecaux (citybikes). The UbiGo FOT (Field Operation Test) was run by a project team, in which a key partner was Arby Communication. UbiGo (the FOT team) negotiated prices with the five transport providers, managed the customer subscriptions and invoicing, and provided higher level customer service (lower-level customer service was contracted out). The ‘app’ (and the Human Machine Interface - HMI) was developed and maintained by Volvo IT/Commute Greener.

After the end of Go:smart-project a group of individuals from the project started UbiGo AB, with the purpose of continuing the service with existing customer base, expanding it into a full service. Challenges with raising start-up capital for financing the technical platform as well as an unclear role of the regional public transport operator, resulted in the closing of UbiGo AB, and the starting of UbiGo Innovations, with the purpose of refining the concept, seeking ways to restart the concept. In October
2017, UbiGo Innovation AB and Fluidtime AG (part of Kapsch) announced a cooperation, in which Fluidtime would provide the technical platform FluidHub and FluidBiz based on UbiGo specifications for the Stockholm pilot starting in March 2018. Together the two companies will also offer a franchising concept for potential MaaS-operators in cities outside the Nordic market, including knowledge, brand and platform.

**Service Model:** UbiGo is a multimodal service as it includes public transport, carsharing, rental car service, taxi and bicycle hiring. The public and private companies providing the modes of transport are: Västrafik public transport, Sunfleet carsharing, Hertz car rentals, Taxi Kurir taxis, and Styr & Ställbikesharing. For end-user access to services, UbiGo customers log in a web interface adapted to smartphones (subsequently referred to as the ‘app’) via a Google or Facebook login. There, customers can activate tickets/trips, make/check bookings, and access already activated tickets (e.g. for validation purposes). The app also allows them to check their balance, bonus, and trip history, and get support (in terms of FAQ/customer service). The app does not include pre- or on-trip journey planning or real time public transport information. Each participant receives a smartcard, used for instance to check out a bicycle from the bike sharing service or unlock a booked car, but also charged with extra credit for the public transport system in case there is any problem using the UbiGo service. UbiGo also includes a customer service phone line open 24 hours per day. The business idea is to procure everyday travel in volume, repackage and deliver it in a simple way, offering an easy everyday life without having to own a car.

The revenue model of UbiGo is a subscription model, meaning that households (customers) pay a monthly subscription, selecting the package that best suits their needs. Credit can be topped up if it runs out, shared between households members, transferred to the next month for future use and the subscription could be modified on a monthly basis [71]. UbiGo uses a household card, rather than an individual card, allowing household members to transfer time in between them. The innovative aspect of UbiGo lies within the one stop shopping. This means that it is an all in one app, all in one invoice, with 24/7 support and bonus for sustainable choices, rather than a combination of transport services, purchased separately.

**Benefits:** Households and travellers who choose to use MaaS through UbiGo keep track of transport-related spendings, they transfer unused travel time for later and they are rewarded with points to validate with UbiGo partners for CO₂ emissions that they save through their transport mode selection.

### 6.1.2 Whim

Whim (https://whimapp.com/) is a commercial platform through which customers can book and pay for transport around the city using a wide range of modal services provided by different operators. It aims to be a more affordable alternative to car ownership without all the hassles. Journey options cover taxi, PT, a car service or a bike share.
Development and partnership: The MaaS aggregator for Whim is MaaS Global, a Finland based company in collaboration with Helsinki Transport. Together they developed Whim app in Helsinki, 2016. MaaS Global is a privately owned mobility service provider (i.e., MaaS operator) and was established in 2015. Mobility service infrastructure includes around 2500 taxis, rental cars from Sixt and HSL (Helsinki Regional Transport Authority) public transport. Whim is being tested to other regions outside Helsinki as well, such as West Midlands, Amsterdam and Antwerp.

Service model: Whim's service model mirrors that one of UbiGo. The app offers pre-purchasable mobility packages (with a monthly quota of mobility points) and a mobile application for journey planning and ICT including a series of transport modes, namely: Public Transport, carsharing, rental car service, taxi and a bicycle system. Revenue for Whim is achieved using the monthly subscription model and the pay-as-you-go model, with a Whim points system. Whim points are travel currency which you can use to pay different transport services within Whim. 1 point equals 1 euro.

- **pay-as-you-go**: no monthly fee, you can always use Whim with a single ticket (Pay per ride).
- **49 € / per month** – Unlimited HSL Helsinki single tickets included, with regional tickets available on demand or as monthly add-on. 5km rides (from pickup location) with Taksi Helsinki and LähiTaksi cost just 10€ through Whim. No more browsing price comparison sites. With Whim Urban you have access to a Veho rental car for just 49€ per day
- **499 € / per month** – Unlimited HSL Helsinki single tickets included, with regional tickets available on demand or as monthly add-on. Unlimited taxi rides with Taksi Helsinki and LähiTaksi within a 5km radius of pickup included. Rides further than 5km are available at regular price. Rental cars are at travellers' disposal at any day and duration according to their needs.

Benefits: The business idea behind Whim is the development of an easy to use app that finds the best way to get from A to B by combining public transport and a variety of options from participating private firms. The Whim app, much like UbiGo, is innovative because it combines and features a series of transport options, includes fees, information on schedules, recommends routes, allows booking and paying for your unified ticket. This process innovation makes it simple for travellers to select their preferred mode of transport, find alternative routes and option not previously considered and complete their booking and payment through a safe, cashless system. Customers access the services by downloading and installing the Whim app to their smartphones. They can log in, make their profile and link it to an account. Payment is handled by Whim, either through pre-pay or a payment card registered...
to the account. Whim claims that the offered service may lead to reduced congestion, less reliance on personal mobility, and a greatly enhanced travel experience (see more in section 0).

### 6.1.3 SMILE

**SMILE (Vienna)** ([http://smile-einfachmobil.at/index_en.html](http://smile-einfachmobil.at/index_en.html)) is a mobility platform that provides users with access to information about all available (in City) means of transport and allows them to book, pay and use them. SMILE had over 1,000 pilot users and integrated a wide range of different transportation providers [9]. In May 2015, the project officially ended. Based on the results of SMILE, the ÖBB (Austrian Railway Operator) created the “ticket shop” and an available test version of the app “WienMobil-Lab”, which integrated private car sharing, bike sharing, taxis, public transport, your own car or bike, offering booking, routing, ticketing and payment. The goal of SMILE was to create the platform that will successfully integrate all modes of transport, making it a unified key to urban transport.

![Figure 4: User interface for SMILE. Source: smile-einfachmobil.at.](image)

**Development and partnership:** At the core of the project team is a cooperation between Austria’s two largest mobility service providers: Wiener Linien (Vienna’s public transport provider, part of the Wiener Stadtwerke group) and Österreichische Bundesbahnen ÖBB (Austrian Federal Railways). Project partners for SMILE include:

- VAO (Verkehrsauskunft Österreich),
- AIT-Router specifically for e-cars and e-bikes and the toursprung router for bike routes.
- Public Transport: Wiener Linien, ÖBB, Linz Linien
- Ship: TwinCity Liner Wien - Bratislava
- Taxi: 31300
- (e-)Bike-Sharing: Citybike Wien, nextbike, Grazbike
- (e-)Carsharing: car2go, Flinkser, EMIL, emorail, e-Carage
- Parkgaragen und Ladestellen: Wipark, Wien Energie Tanke, Energie Steiermark, Parkgaragen Elbl
- Routingpartner: Verkehrsauskunft Österreich, AIT, toursprung

**Service model:** SMILE customers access the platform, select their destination and receive a number of recommended options to get there. The customer has access to transport information, schedules,
alternative routes and modes of transport and can book their preferred ticket, pay through the platform and use their ticket. The Mobility shop offers GVH tickets online and many more - comfortably from home or on the go and cashless. Revenue for SMILE comes from the pay as you go system.

**Benefits:** Users of SMILE access all urban transport options easily, from home or on the go, using their smartphone. They have access to all necessary information that affect their journey as well as a set of alternatives in case journey information or travel time changes. For trips from A to B the mobility platform offers different individual options and combinations. These can be sorted by mean of transport, time, price and CO₂. With a filter, certain means of transport can be filtered individually. A mobility platform like SMILE therefore increases the usage of sharing offers and e-mobility and at the same time reduces the occasions when private cars are used. According to the application’s website [28], the first findings include the following: 48% of the respondents stated that they use public transportation more often, 21% reduced the use of their private cars. Smile also pushed intermodality. 26% combined car and public transportation more often and 26% combined bike and public transportation more often.

When choosing the means of transportation the pilot users preferred to be shown the public transportation routes (80% metro, 77% tram). Also carsharing (21% Car sharing, 7% e-Car sharing) and bike sharing offers (10% bike sharing and 5% e-bike sharing) raised interest.

### 6.1.4 VAO - Austria

Traffic Information Austria (VAO) ([https://verkehrsauskunft.at/](https://verkehrsauskunft.at/)) is a collaborative traffic information service for all of Austria which aims to provide consistently high quality services that cover all traffic developments (for cyclists, pedestrians, public transport, motor vehicles, etc.) [35]. VAO is a collaborative project with the following members:

- ASFINAG (coordinator),
- the working group of Austrian transport association organisers (ARGE ÖVV),
- ITS Vienna Region,
- Ö3 traffic editorial staff,
- ÖAMTC,
- The City of Graz as well as the federal provinces of Burgenland, Carinthia, Lower Austria, Salzburg, Styria, Tyrol and Vienna.

Co-opted partners are Austro Control, the Austrian Association for Rehabilitation (ÖAR), the Austrian Federal Ministry of the Interior and the Federal Province of Upper Austria.

All participants open their traffic data, traffic situation and travel time calculations as well as traffic alerts to VAO. The Graph Integration Platform (GIP) serves as digital map, which is more up to date and more detailed than all conventional graphs AustriaTech is the trusted party that ensures all interested parties and partners equal, non-discriminatory access to VAO. After VAO was tested and completed as a project, VAO II emerged with the view to further improve the existing infrastructure grow. More specifically, VAO II enhances the collection of additional data and the detection of traffic data and real time data that will help optimise mobility services along with usability and performance of end user services.

### 6.1.5 MyCicero

MyCicero ([http://www.mycicero.eu/](http://www.mycicero.eu/)) is an Italian application that brings together parking, bus, metro and train and with a unified payment system. It is the result of a collaboration between big key players in the Italian infrastructure and mobility networks such as:

- Trenitalia
• Arriva
• Atac – Roma
• Gruppo Torinese Transporti
• Transporto Passegeri Emillia – Romagna
• Marino autolinee
• ATM

Figure 5: MyCicero user interface for android smartphones. Source: MyCicero – GooglePlay.

MyCicero provides the following:
• Domestic connections integrated with the local travel solutions.
• A single ID for all the services of the territory.
• Top up the credit in MyCicero and use it for every payment.
• Share your journeys with your friends.

Travellers can download the app to their smartphones, create an account and check, plan, book and pay for all their journeys through My Cicero. The app is fully updated with timetables of different transport modes, lines, stops, real time information on arrivals and departures, ticket pricing and passes and can also suggest routes for the traveller to choose. An important asset of MyCicero is that it has integrated urban and national lines.

6.1.6 Hannover-mobil

Hannover-mobil (https://www.gvh.de/en/mobilitaetsshop/produktuebersicht/hannovermobil/) has been up and running since 2004 (relaunched as a pilot in 2014) and is run by the PT authority in Hannover. Hannovermobil was the first of its kind: a platform that integrated different mobility options in the city. It combined traditional PT with taxis, bike services, car-hire, car-sharing and a luggage service, all in one platform. It was a pioneering piece of innovation, and smartphone or not, it was a smart solution to a city problem.

**Development and partnership:** The aggregator for Hannover-mobil is the Hanover PT operator, üstra, and the Transport Association of Greater Hanover ÜSTRA Hannoversche Verkehrsbetriebe Aktiengesellschaft.
Project partners include: GVH, Deutsche Bahn, Stadtmobil, Hallo Taxi 3811

Üstra will relaunch "Hannovermobil 2.0" by adopting a new approach boosted by trends such as mobile technology, the sharing economy, changing lifestyles and the end of the oil age. Hannovermobil 2.0 will follow a much more flexible philosophy, following the McDonald’s approach where customers can self-customise their mobility menu. It will feature an online one-stop-mobility shop integrating e-ticketing and multimodal trip planning.

**Service model:** Hannovermobil can be accessed by travellers online in order to find information, routes, schedules and transport modes that can take them to their destination. The PT operator offers a monthly subscription to a digital, one-stop mobility shop with integrated mobile phone billing as well as discounts. PT pass holders are offered discounts for carsharing, taxi, car rental and long-distance rail. A common card is used for PT and car sharing and the costs for using these modes as well as taxi are also collected on the same bill. A smartphone application is now available with real time information on public transportation and possibility to buy tickets directly in the app.

Regarding travellers, the main benefit of HannoverMobil comes through the combo package: an annual transport ticket within Greater Hannover – available for individual adults and for business customers as well as for people aged 60+ and students. For an additional €6.95 a month, this annual ticket can be upgraded to a complete mobility package. Since 2009, users of the HANNOVERmobil card gained access to 112 Car-Sharing vehicles at 68 stations in 7 cities in the region. Savings include the €79 sign-up fee and the €5 monthly fee, while they are not required to pay the usual deposit.

HANNOVERmobil customers get a 20% discount on taxi journeys with the largest taxi company in Hanover. If the customer wants to take a longer holiday journey, rent a small van, or use a car for a one-way journey (within Germany), s/he gets a special rate at a car rental agency. Luggage storage in the customer centre of the transport provider in the centre of Hanover is free. In addition, a free BahnCard 25 for the German Railway system (valued at €55) is included. The value of this card is also taken into account if a customer upgrades to a BahnCard 50 or 100. All combo card transactions are cashless and are combined into a single monthly “mobility bill.”

**Benefits:** According to the chair of the Hannover transport company Üstra, André Neiß, there are several economic benefits for the public transport operator. More specifically [36]:

- Customer loyalty in public transport per customer per year is valued at €60. This corresponds to the amount resulting from annual ticket holders who decide not to proceed with a previously planned car purchase and instead decide to renew an annual public transport ticket.
- Customer attraction effect adds €35 per customer per year. That is the profit gained by the transport company because public transport users now get an annual ticket in order to take advantage of the discounts offered by the package purchase.
  - Of that, €30 per customer per year must be deducted because of the rebate offered on the public transport ticket.
  - Profit margins for the public transport association in Hanover corresponds to €65 per participating customer per year (currently approximately €65,000 a year).

The most important providers of the integrated service conclude that although customer demand has not fully met early expectations, both the public transport authority and the Hanover Car-Sharing provider Stadtmobil Hannover are satisfied with the package and its impacts.

6.1.7 **Moovit**
Moovit (https://moovit.com/) is a public transit data and analytics company that provides urban mobility analytics, transit surveys, transit data, real-time bus location and trip planning services. It is an open source project, collecting data from riders and commuters to share with users. The company offers its services in more than 2,000 cities in 80 countries. The transport data that is being generated is used to help municipalities and transit operators manage their networks in a more efficient and smart manner.

Figure 6: User interface for Moovel app [Source: https://moovit.com/].

**Service and revenue model:** Moovit is a free app that users can download on their smartphone, register, sign in and start using immediately. Being an open source service means that the more users, the better the information depicted on Moovit. The revenue model of Moovit is based on the provision of data to customers such as transit operators, municipalities etc. that need to have insights regarding transport issues, trends and preferences.

**Promotion Strategy:** Moovit announced they have raised a $50 million investment that will allow them to expand their global sales team, enhance products to achieve further growth and to invest in its MaaS platform.

### 6.1.8 EMMA

The EMMA service (http://www.tam-voyages.com/presentation/?rub_code=52) is a multimodal platform developed and launched in Montpellier, by TaM, in 2014. It covers all routes accommodated by bus, tram, bicycles, carsharing while at the same time it covers tramway parking and pay-per-hour TaM parking at the city centre. All services are integrated in a single space and accessed by one web entry.

**Development and partnership:** The launching of EMMA was accompanied by the opening of a new website: tam-voyages.com. Following the model of SNCF, the portal allows users to prepare their journey by indicating their starting point and their destination or by indicating the preferred modes of
transport, before optimizing their route. Walking and using private vehicles are also taken into consideration. Finally, in order to ensure the smooth journey of travellers, EMMA takes into consideration traffic congestion through real time data collection.

**Service model:** Travellers use the website tam-voyages.com to access the EMMA services. Users can select and subscribe to a mobility contract, charged €20 or €36 per month, with an unlimited access in tramways, buses and tramway-parkings. The use of city-centre parkings and of bicycles is charged extra. For €40 per month, a multimodal package guarantees access to rental services of Modulauto vehicles. Users can obtain their EMMA card at any mobility area of the TaM. Once this card is used to use a transport mode, the bank account of the user is directly debited. Users may see the available sum on the device portal. Once the card is badged on the base station, the bank account of the user is directly debited [39].

### 6.1.9 MOOVEL

**Moovel** ([https://www.moovel-group.com/en](https://www.moovel-group.com/en)) is an application that allows users to search, book and pay for rides in a single experience. It is a countrywide service available in many German cities, unlike most of the above mentioned projects that are tied to a single city. It includes PT, car rental, carsharing, bikesharing and taxi as well as national rail. The aim of Moovel is to radically simplify mobility in towns and cities.

**Development and partnership:** Moovel is developed and owned by the respective fully-owned subsidiary of Daimler AG and is working on building an operating system that offers access to suitable mobility options. All modes are provided by different actors, which are connected and combined in the Moovel mobile application, including intermodal journey planning, booking and payment for almost all services as well as ICT integration (operable through a single platform), but no ticketing integration.

**Service model:** Users access the services through the Moovel app on their smartphones or smart devices. The **Moovel app compares the mobility offers of different providers in terms of price and duration** – for the optimum route from A to B. It shows information on driving time and costs of public transport, carsharing providers, mytaxi, a rented bicycle and the German railroad system Deutsche Bahn. Users can then select what they prefer and can reserve, book and pay for the different means of

![Figure 7: User interface for Moovel app. Source: moovel.com/de/en.](https://example.com/image.png)
transport for a route. Since the summer of 2016 it has also been possible to pay for journeys in Moovel via PayPal. Moovel is expanding its range by investing in smart routing and pooling in order to extend local transport networks. The software platform Moovel on-demand helps PT operators to be more flexible and can be seamlessly integrated into their existing services.

### 6.2 Single dimension MaaS services

The extent to which enterprises fulfil one or more roles in the MaaS ecosystem is dependent on market conditions. There is a number of business examples securing a position in MaaS across the Transport Operator, Data Provider and MaaS Provider layers of the ecosystem. For example, the Uber’s taxi based MaaS offering or, alternatively, the Train Operating Companies and carsharing enterprises that provide apps for their passengers’ use. In contrast to occupying a ‘full stack’ within the MaaS ecosystem, there are examples of businesses focussing on a narrower set of capabilities, associated with one role [25].

The commercial development of MaaS encompasses both single-mode and multimodal journeys, value-added services, innovative products and pricing models, as well as real-time, on-demand service planning. The growth of service-based platforms in other sectors has been strong in recent years, with industry analysts predicting further growth. The fact that many cars are parked for over 90% of the time may provide an opportunity for the ‘as a service’ model to offer consumers better value than offered by the car ownership model [54].

The carsharing market is predicted to have a compound annual growth rate of 23% between 2013 and 2025 [77]. Below we summarise car/ ride sharing and other services that are not typical MaaS, but are relevant as they influence the change of mobility paradigms and are going to have crucial importance within further and more advanced MaaS services.

#### 6.2.1 Uber - Private Taxi and ridesharing

The Uber service ([https://www.uber.com/en-GR/](https://www.uber.com/en-GR/)) offers private taxi and sharing services worldwide. Uber has different forms of provided ridesharing services. For instance, taxi or private drivers are able to provide rides based on the general provided Uber pricing schemes adopted within the differently provided countries. In some countries only licenced Uber drivers with specific taxi-like vehicles are allowed to provide their Uber services in order to maintain a healthy level of competition with other local taxi service providers.

#### 6.2.2 CarUnity

CarUnity ([Opel Carsharing Concept](http://media.gm.com/media/intl/en/opel/news.detail.html/content/Pages/news/intl/en/2015/opel/06-24-car-unity.html)) enables individual mobility everywhere in Germany. People can offer their car for rental or rent a car with the free app. Thanks to the innovative app, car owners can decide who they may rent their car to. CarUnity users can, for example, offer their car only to their Facebook friends or to people in their personal CarUnity network. The entire transaction takes only a few seconds with the user-friendly app. Fuel costs are covered by the renter [63].

#### 6.2.3 DriveNow carsharing

DriveNow ([https://www.drive-now.com/en/](https://www.drive-now.com/en/)) is a Joint Venture organisation between BMW and the global car rental organisation Sixt car. BMW is providing the vehicles and Sixt car rental enables the carsharing system architecture. The service is provided in European countries, such as Germany, Austria, Denmark, Sweden, Belgium and Great Britain. DriveNow is a **free-floating car-sharing system**,
meaning it allows travellers to go from point A to point B, without having to return to their original point. This provides a higher degree of liberty considering the parking establishments, as their vehicles are allowed to park on public parking areas wherever contracts between municipalities and the company are available.

6.2.4 BlaBlaCar – Private ride sharing

Private ridesharing platform covering 19 European countries. BlablaCar ([https://www.blablacar.com/] ) is organised as a Peer2Peer ridesharing system. In contrast to Car2Go and DriveNow, the BlablaCar ridesharing platform was developed from the ‘Comuto’ consortium located in Paris, with the focus to become established in a European wide network of integrated ride-sharing services.

As far as the pricing of offering rides to the platform is concerned, EU member states currently do not have a common practice deployed. As passengers only contribute to fuel costs, no profits are made by drivers. BlaBlaCar conscientiously fulfils these conditions by limiting the number of seats that can be offered to four and setting a price limit for the passenger. BlaBlaCar does not own any vehicles; it is a broker that in some countries (e.g. Czech Rep.) works temporary for free while elsewhere receives a fixed price e.g. 1 Euro or a 12% commission on every booking. Compared to some other sharing economy areas like Uber or AirBnB, a higher willingness to pay for a considerable proportion of participation charges is accepted by participants.

6.2.5 SBB & Mobility app

The Mobility app ([https://www.mobility.ch/en/] ) is an incentive led by SBB, the national railway operator of Switzerland. It aims to encourage users to share vehicles and rent them just for the hours they need to move around.

SBB collaborates with a number of private vehicle providers and offers discounts to PT pass holders for bikesharing and carsharing (and cooperating with these opera-tors to locate vehicles close to train stations). To facilitate booking and adoption, the Mobility app was created, to help users easily select, book, unlock, use and pay for the vehicle they use. Mobility vehicles can be reserved through the Mobility app, through the website or through the 24/7 Mobility Service Centre. Upon booking the vehicle, users can use it just after one hour, making the service flexible and direct. SBB has ensured a strong collaboration, resulting in approximately 1,150 vehicles at more than 400 train stations.

SBB, in collaboration with Mobility, guarantees there are no hidden costs as subscription prices include fuel costs, mobility parking space, insurance, repairs, service, tyres, etc. Also, users can pay on a monthly basis and receive one detailed invoice. Vehicles can be reserved by the hour and at any time up to one hour before the user’s desired departure time. Reservations can be modified using the on-board computer in the vehicle, the Mobility app or by contacting the Mobility Service Centre. SBB has estimated that annual benefits resulting from Mobility customers correspond to 22,300 tonnes of CO\textsubscript{2} saved [42].

Users access numerous transport modes easily, quickly and at competitive prices compared to the use of private vehicles.

6.2.6 Car2Go carsharing

Daimler’s Car2Go ([https://www.car2go.com/US/en/] ) is offering its carsharing service in more than 30 cities worldwide. Using the app, the users are able to reserve and access the wherever parked cars. The service is provided as a free-floating car-sharing system, with the users able to begin and end their rides.
"wherever they want" within Car2Go operating areas. The business model is very similar in all 30 different cities, although some rates differ by location. Users are charged by a per-minute rate, and the offering includes discounted fixed rates applied to hourly and daily usage. Rates are basically all-inclusive and cover insurance, maintenance, rental, parking and fuel. Compared to some other carsharing business models, Car2Go offers only one type of car considering its economy service, which is a Daimler car (Smart), similarly as DriveNow is providing BMW vehicles.

6.2.7 SHIFT (Las Vegas)

SHIFT (formerly knowns as Project100) (http://www.goproject100.com/) aimed at innovating transportation in downtown Las Vegas through a web of shared vehicles [37]. SHIFT designed a 24/7 booking system for its vehicles as well as intelligent in-vehicle systems. Customers paid on beforehand for monthly trip time (minutes) which they were then free to use on different transport modes. Additional trip time could be purchased if the customer ran out. Further to that, they aimed to use Tesla vehicles as their sharing mode of transport. SHIFT (Las Vegas), started in 2013 but was shut down after two years of testing. People tended to focus on the vehicles, through aggressive publicity, and the company closed down after two years of testing. It provided a variety of different services, using vehicles owned by the mobility integrator (Project 100) itself.

6.2.8 Communauto

Communauto (https://www.communauto.com/index_en.html) is a Canadian low cost carsharing service providing access to a wide range of vehicles for users who need to make a scheduled journey, by pre-booking their vehicle, or a spontaneous journey by using the instant booking service. Communauto offers various monthly subscriptions as well as benefits for extra savings, such as making a family membership, better long distance fares and weekday use of vehicles at non-changing rates [41].

6.2.9 Cambio

Cambio CarSharing (https://www.cambio.be/cms/carsharing/en/) is a carsharing company which was formed in 2000 as a merger of several carsharing companies in different cities in Germany and Belgium. Customers can sign up through the company's order form. Upon signing up, users receive the cambio chip card by post. Booking their vehicles is easily done via the cambio app or website, for any duration necessary. At the end of each month, users receive a detailed invoice summarising the reservations made. Cambio can be considered a MaaS at an early stage as it does not incorporate payment in its system.

6.2.10 CapMetro – Austin, Texas

Capital Metro (https://www.capmetro.org/) [40] is Austin's regional PT provider. They offer travellers different ways to get where they need to be by providing planning tools, schedule information, maps and "park & ride" information on their app. Users can turn their mobile phones into passes and they can use the app to buy passes for all services, on a pay as you go basis. This shows that they have incorporated all transport information in one app, but booking and purchasing tickets are still not integrated into one service.

6.3 Research initiatives tackling MaaS

6.3.1 Cluster projects
6.3.1.1  iMove

iMove (http://www.imove-project.eu/) is a project funded by the EU’s Horizon 2020 research and innovation programme. The project aims to encourage the use and the scalability of European MaaS schemes and research solutions to improve MaaS in terms of operation and business model. iMove is for travellers, operators, transport authorities, service providers, IT developers and MaaS providers. The project will collect real-time data concerning user needs, habits and preferences and will deliver tools to help exchange information between systems. This will enhance interoperability between different MaaS schemes. There are four European Living labs where iMove solutions will be tested: Berlin, Göteborg, Greater Manchester and Turin. In addition, iMove will also test MaaS roaming for cross border services within Europe.

6.3.1.2  MaaS4EU

MaaS4EU (http://www.maas4eu.eu/) is another EU project funded by the Horizon 2020 research and innovation programme. Seeing as transport needs are increasing and new mobility habits are arising, MaaS4EU aims to quantify trends, habits, preferences and business aspects in order to encourage the growth of MaaS and to tackle challenges in the following sectors: business, end users/customers, technology & data and policies.

To achieve this, MaaS4EU will define sustainable business models that can encourage cooperation between different transport stakeholders and that can help them better understand traveller needs. As a result, implementing the appropriate technological infrastructure and identifying the necessary policy and framework will be easier. Overall, three pilot cases (UK, LUX-DE, HU) will be applied to demonstrate MaaS within urban, intercity and cross-border trips.

6.3.2  MAASiFiE

MAASiFiE (http://www.vtt.fi/sites/maasifie) was a project funded by the CEDR Transnational Road Research Programme 2014 concerning Mobility and ITS. The project aimed to identify MaaS models and related needs and contribute to the creation of a European MaaS Roadmap 2025. Project objectives included MaaS state-of-the-art and trends analysis, business and operator models development, analysis of technological requirements and interoperability issues as well as social, economic and environmental impact assessment of MaaS.

Outcomes of the project were a medium-term Roadmap 2025 where roles and responsibilities of different stakeholders are included, as well as future recommendations of MaaS. Project coordinator was VTT Technical Research Centre of Finland Ltd and the project had a duration of two years. (June 1st, 2015 to May 31st, 2017). AustriaTech and Chalmers University of Technology were project partners.

6.3.3  SocialCar

SocialCar (http://socialcar-project.eu/) is a running research and innovation project that aims to incorporate carpooling into existing mobility systems, through the use of powerful planning algorithms and big data integration from public transport, carpooling systems, and crowd sourcing. The project aspires to change solo car use, save travelling time and improve the environment [29].

Development and roles: The project unites ITS developers, social and economic scientists, transport engineers, carpoolers and public authorities from Italy, Greece, United Kingdom, Luxembourg, Poland, Switzerland, the Former Yugoslav Republic of Macedonia, Croatia, Slovenia, the Netherlands, Hungary, Spain and Belgium. The purpose of SocialCar is to design, develop, test and roll out a service that simplifies the travel experience of citizens in urban and peri-urban areas. SocialCar will define data
processing flows and design algorithms to match travel requests with the integrated public-private transport supply, complemented by a reputation-based mechanism.

**Service model and results:** Travellers can download the SocialCar app to their smartphone and log in to receive the information they seek and also to broadcast the information they receive. More specifically, users can arrange car-pooling rides, provide real time information on transport mode delays and parking availability at the train stations. Also, other passengers who are already riding a means of transport (bus, train) can provide real time info on seat availability, etc. As a result, travellers can better plan their journey, save time, ensure a parking spot and avoid congestion.

### 6.3.4 SOCRATES

Public and private partners of the SOCRATES 2.0 (www.socrates2.org) project developed a framework for cooperation in traffic management on a strategic level. The framework is relevant and valuable to all relevant stakeholders in traffic management: international service providers, car manufacturers, ITS companies and road authorities. This framework will be the basis for a European deployment of Interactive Traffic Management, originating from TM2.0 platform.

SOCRATES 2.0 is a pan-European project where public and private partners are realising smart traffic services and traffic management in the regions of Amsterdam, Munich, Antwerp and Copenhagen. Project pilots will start as of January 2019. International service providers, a car manufacturer, ITS companies and road authorities are cooperating and sharing information in order to create new and better services for road users. Together they investigate the feasibility and usefulness of interactive traffic management for these services.

By exchanging and integrating all available information from road authorities, service providers and road users, you can create a complete and consistent picture of the expected traffic situation. This way you can anticipate real-time and expected circumstances and provide smart traffic and navigation services. Cooperation and the use of smart services by road users will thus lead to faster, greener and safer traffic. Besides realising smarter services for road users, the partners in SOCRATES 2.0 are defining and experiencing public-private cooperation in traffic management. Beyond data sharing, they can develop common traffic management strategies. The lessons learned are expected to be valuable to all relevant stakeholders. Finally, SOCRATES 2.0 also provides the essential building blocks to prepare Europe for the future of self-driving cars. It is anticipating the integration of traffic information and navigation services in self-driving cars.

### 6.4 MaaS offerings overview

In addition, the above discussed schemes have been clustered in the table below across six (6) main stages of cooperation [53]:

1. **Cooperation only in terms of providing discounts for combined subscriptions.**
2. **Ticketing integration:** when one smart card can be used to access all the modes taking part in the service payment integration and/or when one single invoice is issued for all of the customers’ mobility needs [52].
3. **Payment integration:** when one single invoice is issued for all of the customers’ mobility needs
4. **ICT integration:** when there is a single application or online interface that can be used to access information about the modes.
5. **Institutional integration**: when multiple modes included in the service are owned and operated by one company.

6. **Integration with tailored mobility packages**: when customers can prepay for specific amounts (in time or distance) of each service tailored towards their needs.

The following table provides an overview and comparison of the MaaS offerings described above across the 6 cooperation stages, whereas it summarises the modes present in each and the key areas of MyCorridor they are addressed, namely:

1. **Mobility Services**: Services related to the online purchase of *Mobility Products*, which are available for purchase via the MyCorridor one-stop-shop.
2. **Traffic Management services**: Services related to the online purchase of Traffic Management related *Mobility Products* and/or the use of advanced Traffic Management concepts in the MaaS framework.
3. **Infomobility services**: Services related to the information and real-time support of the user in *pre-trip phase* (trip planning, support in decision of what *Mobility Product* to purchase), *on-trip phase* and *after trip phase*.
4. **Added value services**: Services giving added value to the user and enhancing user experience.

### Table 2: Integration Level per MaaS scheme/solution.

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Integrator</th>
<th>Description</th>
<th>Integration level</th>
<th>Modes</th>
<th>MyCorridor services key clusters addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communauto+ BIXI+Public Transport CANADA</td>
<td>Communauto</td>
<td>Car sharing operator offering their members discounts for bike sharing and public transport passes.</td>
<td>x</td>
<td>Bike, PT, Taxi, Car share</td>
<td>Mobility services</td>
</tr>
<tr>
<td>SBB+Mobility+ Publibike SWITZERLAND</td>
<td>SBB</td>
<td>Rail operator offering discounts to public transport pass holders for bike sharing and car sharing (and cooperating with these operators to locate vehicles close to train stations).</td>
<td>x x x</td>
<td>Bike, Rail, PT, Taxi, Car share, Car rent</td>
<td>Mobility services</td>
</tr>
<tr>
<td>Hannovermobil, GERMANY/ Hannover</td>
<td>Üstra</td>
<td>PT operator offering for €10 subscription to a digital, one-stop mobility shop, with integrated mobile phone billing and discounted pricing.</td>
<td>x x x x</td>
<td>PT, Taxi, Bike, Car share, Car rent</td>
<td>Mobility services, Infomobility services, Added value services</td>
</tr>
<tr>
<td>EMMA, FRANCE /Montpellier</td>
<td>TAM</td>
<td>PT operator offering single-key access to 30 or more</td>
<td>x x x x</td>
<td>Bike, PT, Car share, car parking</td>
<td>Mobility services, Traffic</td>
</tr>
<tr>
<td>Initiative</td>
<td>Integrator</td>
<td>Description</td>
<td>Integration level</td>
<td>Modes</td>
<td>MyCorridor services key clusters addressed</td>
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<tr>
<td>MyCorridor</td>
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<tr>
<td>Smile</td>
<td>ÖBB</td>
<td>Rail operator offering door-to-door integrated transport planner; book ticket and pay.</td>
<td>x x x</td>
<td>Bike, PT, Taxi, Car share, Car rent</td>
<td>Management services • Infomobility services</td>
</tr>
<tr>
<td>AUSTRIA / Vienna</td>
<td></td>
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</tr>
<tr>
<td>Moovel</td>
<td>Moovel Group</td>
<td>Service aggregator and his Moovel mobility app combines local public transport, the car-sharing provider car2go, mytaxi, rental bicycles and Deutsche Bahn. Most services can be booked and paid for simply and directly via the moovel app.</td>
<td>x x x</td>
<td>Bike, PT, Taxi, Car share, Car rent</td>
<td>Mobility services</td>
</tr>
<tr>
<td>GERMANY</td>
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<tr>
<td>UbiGo</td>
<td>UbiGo AB</td>
<td>Monthly subscription starting at €150 per month, delivered via an app and enabling access to a range of transport modes, and with a single monthly invoice.</td>
<td>x x x x</td>
<td>Bike, Bus, Taxi, Car share, Car rent</td>
<td>Mobility services</td>
</tr>
<tr>
<td>SWEDEN / Gothenburg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whim</td>
<td>MaaS Global</td>
<td>Tailored customer segments offer, online booking and paying on a pay as you go and/or subscription basis.</td>
<td>x x x x</td>
<td>Bike, PT, Taxi, Car share, Car rent</td>
<td>Mobility services</td>
</tr>
<tr>
<td>FINLAND / UK</td>
<td></td>
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<tr>
<td>VAO</td>
<td>ASFINAG</td>
<td>Information hub for all of Austria, covering all transport activities. Routing and other information content is provided for most modes of transport</td>
<td>x x x x</td>
<td>Bike, PT, Taxi, Car share, Car rent</td>
<td>Traffic Management Services • Infomobility Services</td>
</tr>
<tr>
<td>Austria</td>
<td></td>
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</tr>
<tr>
<td>Initiative</td>
<td>Integrator</td>
<td>Description</td>
<td>Integration level</td>
<td>Modes</td>
<td>MyCorridor services key clusters addressed</td>
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<tr>
<td>MOOVIT</td>
<td>MOOVIT</td>
<td>Public transit data and analytics company that provides urban mobility analytics, transit surveys, transit data, real-time bus location and trip planning services.</td>
<td>1 2 3 4 5 6</td>
<td>Public Transport</td>
<td>• Traffic Management Services</td>
</tr>
<tr>
<td>MyCicero</td>
<td>Italian infrastructure and mobility networks</td>
<td>Combination of parking, bus, metro and train and with a unified payment system.</td>
<td>1 2</td>
<td>Public transport, train on urban and interurban level</td>
<td>• Mobility services • Traffic management services • Infomobility services</td>
</tr>
<tr>
<td>Uber</td>
<td>Uber</td>
<td>Private taxi and sharing services worldwide.</td>
<td>1 2</td>
<td>Taxi, taxi sharing services</td>
<td>• Mobility Services</td>
</tr>
<tr>
<td>CarUnity</td>
<td>Opel CarSharing</td>
<td>Individual mobility everywhere in Germany. People can offer their car for rental or rent a car with the free app.</td>
<td>1 2</td>
<td>Private vehicles</td>
<td>• Mobility services</td>
</tr>
<tr>
<td>DriveNow</td>
<td>BMW/Sixt</td>
<td>Joint Venture organisation between BMW and Sixt car to provide the vehicles and Sixt car rental in a carsharing system architecture.</td>
<td>1</td>
<td>Car renting</td>
<td>• Mobility services</td>
</tr>
<tr>
<td>BlaBlacar</td>
<td>Comuto</td>
<td>Private ridesharing platform covering 19 European countries, organised as a Peer2Peer ridesharing system.</td>
<td>1</td>
<td>Private vehicles</td>
<td>• Mobility services</td>
</tr>
<tr>
<td>Initiative</td>
<td>Integrator</td>
<td>Description</td>
<td>Integration level</td>
<td>Modes</td>
<td>MyCorridor services key clusters addressed</td>
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</tr>
<tr>
<td>Car2Go</td>
<td>Car2Go/Daimler</td>
<td>Carsharing service where users can reserve and access the wherever parked cars. The service is provided as a free-floating car-sharing system. Users can begin and end their rides “wherever they want” within Car2Go operating areas.</td>
<td>1 2 3 4 5 6</td>
<td>Private vehicles</td>
<td>Mobility services</td>
</tr>
<tr>
<td>SHIFT</td>
<td>Project100</td>
<td>Shared vehicles through a 24/7 booking system. Customers pay on beforehand for monthly trip time (minutes) which they are free to use on different transport modes.</td>
<td>1 2 3 4 5 6</td>
<td>Private vehicles, PT</td>
<td>Mobility services</td>
</tr>
<tr>
<td>Cambio</td>
<td>Cambio</td>
<td>Carsharing company where customers sign up and receive the Cambio chip card by post. Booking their vehicles is done via the Cambio app or website, for any duration necessary.</td>
<td>1 2 3 4 5 6</td>
<td>Private vehicles</td>
<td>Mobility services</td>
</tr>
<tr>
<td>Capmetro</td>
<td>Austin PT Provider</td>
<td>Austin's regional public transportation provider. Provides planning, booking and paying online through their website.</td>
<td>1 2 3 4 5 6</td>
<td>Public Transport</td>
<td>Mobility services</td>
</tr>
</tbody>
</table>

As it is obvious from the above table, none of the above scheme/solutions integrates and provides services belonging to all MyCorridor anticipated clusters. As such, MyCorridor seems to be the most holistic solution in the field from this perspective. The extent to which MyCorridor will achieve to fulfil all 6 integration levels mentioned above will be evaluated later in the project (WP6 and WP7).
6.5 First outcomes from MaaS piloting in Cities

As stated in the Polis Discussion Paper [64], a major concern refers to the role of the transport authority in the MaaS environment, the right public-private sector balance, the business model and the potential impact on travel behaviour and habits. As a result, a number of cities have developed and tested MaaS (schemes and solutions described in section 6.1 and 6.2) in order to create awareness, evaluate its performance, detect weak spots, create awareness with local authorities and attract interest from private players. MaaS is expected to significantly reduce traffic by minimising the need for car ownership amongst users. This may also lead to healthier transport habits, such as walking, cycling, etc. Also, MaaS could allow better use and better allocation of the existing resources and infrastructure, optimising the city's transport network.

The first pilot applications have indicated that most users are ready to adopt MaaS, whereas traffic and congestion were reduced as fewer vehicle owners used their vehicle and travellers could better keep track of their travel-related finances.

The table below depicts the MaaS activities per city as well as the emerging results (for those cases that are available and could be accessed by MyCorridor). The results for UbiGo and SMILE in specific are based on the Impact Analysis Assessment that was conducted within the MAASiFie project [54].

Table 3: Pilot outcomes of MaaS in Cities.

<table>
<thead>
<tr>
<th>City</th>
<th>MaaS scheme/solution</th>
<th>Key outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gothenburg</td>
<td>UbiGo</td>
<td>• After the initial 6 months of testing, no single household stopped using the UbiGo service.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Most of them wanted to continue to use the service.</td>
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<tr>
<td></td>
<td></td>
<td>• None of the households stopped using the service and a clear majority wants to stay as customers [30].</td>
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<tr>
<td></td>
<td></td>
<td>• 46% reported greater bus/tram use - 5% more tram use (travel diaries); 35% more bus use (travel diaries).</td>
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<tr>
<td></td>
<td></td>
<td>• 8% reported less local train use (travel diaries).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 44% reported less private car use (travel diaries).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 51% reported greater carsharing use (travel diaries).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 15% reported greater car rental use.</td>
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<tr>
<td></td>
<td></td>
<td>• 8% reported greater taxi use.</td>
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<tr>
<td></td>
<td></td>
<td>• 7% reported greater use of bikesharing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3% reported less use of private bike* note that UbiGo ran during the winter half of the year from November through April.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 15% reported more walking (travel diaries) - *note that UbiGo ran during the winter half of the year from November through April.</td>
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<tr>
<td></td>
<td></td>
<td>• 50% reported a more positive attitude towards bus/tram.</td>
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<td></td>
<td></td>
<td>• 5% reported a more positive attitude towards local train.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 20% reported a less positive attitude towards private car.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 58% reported a more positive attitude towards carsharing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 17% reported a more positive attitude towards car rental.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 12% net reported a more positive attitude towards taxi.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 41% net reported a more positive attitude towards bikesharing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 11% reported a more positive attitude towards private bicycle.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 14% reported a more positive attitude towards walking.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 68% perceived having more alternatives from which to choose.</td>
</tr>
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<td>• 49% perceived a reduced transportation expenditure.</td>
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<td></td>
<td>• 69% perceived that it became easier to pay and keep track of transportation.</td>
</tr>
<tr>
<td>City</td>
<td>MaaS scheme/solution</td>
<td>Key outcomes</td>
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<td>-------------------------</td>
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</table>
| Helsinki, West Midlands, Amsterdam | Whim                | • Modal shift split in Helsinki: cycling 6%, PT 34%, private car 20%, walking 29%, other 2%.  
• Projected modal split for Whim subscribers in Helsinki 2020: car-share 2%, car rental 2%, taxi 13%, cycling 11%, PT 46%, walking 26%.  
• Trips made before Whim and after Whim in Helsinki:  
  • Before: PT 48%, Private Car 40%, Bike 9%, Other 3%  
  • After: PT 74%, Private Car 20%, Bike 5%, Other 1% |
| Vienna                  | SMILE               | • When choosing the transportation means, the pilot users preferred to be shown in priority the PT routes (80% metro, 77% tram).  
• In addition, interest was raised for carsharing (21% car sharing, 7% e-car sharing) and bike sharing offers (10% bike sharing and 5% e-bike sharing).  
• Intermodality was increased → 26% of them confirmed an increased use of PT in combination with their private cars, whilst 20% of them combined PT and bicycle rides more often.  
• Mostly shared bikes (68%) and private bikes (51%) were combined with PT, followed by private car (51%), carsharing (49%), e-carsharing (8%) and e-bike sharing (5%).  
• Main motivation for the increase in combinations of public transportation and car / bike is the quicker alternative that SMILE suggested (69%/ 74%).  
• 48 % stated that their mobility behaviour changed through the use of the smile app.  
• 55 % stated that they combine different modes of transport as required.  
• 60 % stated that they discovered new routes on their leisure trips with the app.  
• 69 % said that suggested routes are faster than the ones they used before.  
• 48 % stated that PT is used more often (26 % urban public transport, 22 % regional public transport).  
• 10 % used bikesharing more often.  
• 4% used electric carsharing more frequently.  
• 4% used their electric bike more often.  
• 21% of the pilot users stated that they reduced the usage of their private car.  
• 60% stated that new routes emerged on leisure trips.  
• 41% stated that new ways emerged on daily routes.  
• 33% registered with new mobility offers.  
• 46% stated that their modal choice on leisure trips changed. |
| Montpelier              | EMMA               | • Growth in public transportation use (+4 % in 2015), bike sharing (+1% in 2015, +10% in 2014) and car sharing (+1% more km driven in 2015, + 5% in 2014) [47].  
• 160000 downloads (50% iOS and 50% Android).  
• Since January 2017: 35 000 operations online.  
• EMMA turnover: 3 million €. |
| Hannover                | HannoverMobil       | • Users of the HANNOVERmobil card gained access to 112 carsharing vehicles at 68 stations in 7 cities in the region.  
• Savings include the €79 sign-up fee and the €5 monthly fee, while they are not required to pay the usual deposit [36].  
• Customer gain for public transport: more than one in three customers has obtained a new annual public transport ticket in conjunction with HannoverMobil.  
• Customer loyalty to public transport: Approximately one third of the 1,000 combo package customers have got rid of a car or decided against a planned car purchase. |
### Key outcomes

- The image of the local PT operator has improved through the combo package. From the perspective of the PT operator:
- The customer loyalty effect in public transport per customer per year is valued at €60. That is the amount resulting from annual ticket holders deciding against a previously planned car purchase and instead renewing an annual public transport ticket.
- The customer attraction effect adds €35 per customer per year. That is the profit gained by the transport company because public transport users now get an annual ticket in order to take advantage of the discounts offered by the package purchase.

### 6.6 MaaS Business Models

MaaS is a new mobility paradigm that, among other, aims to bridge the gap between public and private transport operators, by integrating all tools and services that a traveller needs in order to make a journey [51]. The core business of MaaS entails the key players as discussed in section 4. Still, names and roles may slightly change across different Business Models.

One type of Business Model (BM) structure for MaaS is the **Reseller Business Model** [3]. In this case, the reseller is the player that gets the services from the Transport Service Providers (TSPs) and resells them to the customers via one interface, as shown in the figure below [23]:

![Reseller BM for MaaS - TSP stands for Transport Service Provider (Source: [23]).](image)

In another popular BM, the so-called **Integrator Model**, the Mobile Service Provider (MSP) provides some extra services/features, such as key enabling technologies, mobile ticketing, payment etc. The integrator is the one who brings together the key enabling technologies from the MSP and the traditional transport services from the Transport Service Providers (TSP), as shown in the figure below [23].
Another business model is the one called “Public Service Provider”, i.e., the business model where the Transport Service Provider (TSP) has also the role of the MaaS operator. This is depicted in the figure below and basically means that the TSP has a double role: providing the traditional public transport means and providing the platform to unify transport services, using the key enabling technologies offered by the Mobile Service Provider (MSP). As a MaaS operator, the PT operator may focus on enriching its services by integrating other transport-related services into its regular service portfolio. These additional services can cover taxis, carpooling, city bikes and some inclusive digital services by the MSPs, e.g. mobile ticketing and payment, and multimodal planner and (re)routing. The TSP as a MaaS operator model is depicted in the figure below [23]:

Last, but not least, the Public Private Partnership (PPP) BM is a model more suitable for rural areas or small towns where authorities are interested in increasing the efficiency of subsidised transportation [23]. Participants include Logistics Service Providers (LSP) and Social Statutory and Health Service Transportation (SST).
A variation of the previous BMs is the one including also traffic management (more particularly TM2.0 features). TM2.0 is ERTICO Platform originated in 2011 from TomTom and Swarco-Mizar and now regroups more than 20 members from all ITS sectors focusing on new solutions for advanced active traffic management. The TM2.0 platform aims to agree on common interfaces to facilitate the exchange of data and information between Traffic Management world and Navigation service providers. In this BM, there are three alternative options:

1. Similar to the Integrators BM: The TM2.0 scenarios could also be part of the added value services integrated by the Integrator.

2. Similar to the Public Service provider BM: The role of the Public Transport operator is now assumed by a Multi modal or road Traffic authority/operator. The objective in this case is at improving the total value chain for consistent management and traffic services by cooperating with other Transportation service providers

3. Similar to PPP BM: The PPP is comprised of an alliance of traffic management operators, public transport operators as well as content and navigation service providers.

MyCorridor will be taking into consideration the different Business Models as presented above – and any other emerging – in the context of WP7: “Business models, incentives and legal issues” and towards the definition of the “Mobility Services Aggregator business model” (D7.1). With the current vision, it seems that the most relevant to MyCorridor BM is the Integrator BM with inclusion of TM2.0 scenarios (variation option 1 as mentioned above), where the Integrator in MyCorridor case is the MaaS Aggregator. Still, this does not mean that more or new Business Models will not be proposed for the exploitation of MyCorridor.

6.7 Incentives & Promotion Strategies

The existing MaaS schemes/solutions try to convince travellers to move away from a world dominated by the need to own a primary mode of transport (such as a car) towards a model where traveling happens through a combination of public/private and shared transport modes. Also, in most cases there is a kind of single app/interface for the travellers that materialises synthetic automated digital interventions based on e.g. intelligent analysis of tracked user behavior with explicit goal setting, adjustment, self-monitoring, feedback and incentive mechanisms.

Automated interventions could cover opportunistic contextual interventions, such as suggesting alternatives (e.g. renting a bike when a bus is late), or utilising social compatibility matching to
encourage a user to join a car pool with someone with whom they share hobbies, as well as the supportive role found in conscious goal-setting based approaches to behavior change.

Mobility service infrastructure providers try to improve the use of their network and free up more capacity by incentivising people to choose when and how to travel jointly in order to promote the behavioral change needed to better utilise transport capacity across the network and provide effective demand-response services satisfying the needs of the travellers. For example, upon seeing a particular area is suffering delays due to congestion, in the MaaS model, cities would be able to offer commuters incentives to behave differently (for example, delay their travel for 30 minutes). This would allow the affected area to clear and ensure the public has a much more satisfying transit experience.

Another benefit would come from personalized travel information and recommendations [75]. Having insight into daily commutes and analyzing each user's unique set of decision factors used when considering a trip, cities would have the ability to advise when a preferred route is unavailable and offer useful alternatives that would get travellers to their destinations on time. Finally, cities would be able to encourage greater social responsibility, extending the benefits from the individual to the community as a whole. Currently the vast part of the citizens’ journeys is not recorded - disappearing from the operators’ radar as soon as they change to a different transport mode or service. Therefore, the city's view of their journey is incomplete and, as such, it is not feasible to provide effective demand-response transport solutions.

In a scenario where the commuter willingly shares some information, the city or the responsible body would be able to, for example, get in touch with habitual urban drivers and encourage them to take on a more socially responsible travel behavior – by pooling with other commuters travelling in the same direction or swapping the car for a train once a week, and offer a reward in return [26].

This scenario could be as well used within corporate mobility concepts, where parking spaces could be offered e.g. only first to those transporting co-workers and using the kind of app to track a shared journey.

Use of incentives should help fulfill a priority of well-defined strategy / policy. From the city point of view (and many corporate aims may be found identical), MaaS could help decrease pollution, reduce congestion on the streets, reduce economic loss as people get to work on time and inspire more consumer trust.

As such, in order to attract interest and participation in MaaS, a number of initiatives tackling the above (and more than that) would preferably be offered to travellers on national and international level, as well as common policies and motives for private players to collaborate with the PT authorities.

As seen in the existing MaaS schemes discussed in sections above (and summarised below), most operators offer discounts, coupons, attractive packages and associated value-added services in order to attract and keep users. This results in financial savings for the users and higher user traffic for the service providers and the mobility operators.

### Table 4: Incentives and promotion strategies for MaaS use/boost.

<table>
<thead>
<tr>
<th>MaaS</th>
<th>Incentives and promotions</th>
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<tr>
<td>UbiGo</td>
<td>Provides a subscription model to address different market segments, allows to share transport credit between household members and transfer unused credit to the next month. For travellers, the main reason for joining was curiosity, with convenience, economy and environment falling a bit behind. MaaS offers great opportunities as mobility services adjust to their lifestyle, become dynamic, personalised, flexible and readily available at a competitive cost, without the financial obligations that come</td>
</tr>
</tbody>
</table>
MaaS | Incentives and promotions
--- | ---
 | with owning a private vehicle.
On the other hand, from the participating providers’ perspective, companies keep up with technology and market demand, attract and ensure a clientele (as fewer users will use their private vehicles) and develop new, innovative and viable business models.
Whim | Provides a subscription model as well as a pay-as-you-go model for those who are testing the app.
SMILE | Provides attractive integrated solutions and packages with private car sharing, taxis, bus, etc.
HannoverMobil | Provides discounts for car sharing, taxis, car rental and long-distance rail. The PT operator offers a monthly subscription to a digital, one-stop mobility shop with integrated mobile phone billing as well as discounts. PT pass holders are offered discounts for car-sharing, taxi, car rental and long-distance rail.
VAO Austria | Provides traffic information services, traffic alerts, travel time calculations and traffic situation for all modes (for cyclists, pedestrians, public transport, motor vehicles, etc.) and depicts them in a digital, up-to-date, detailed map.
MyCicero | Provides PT, bus, taxi, metro information services in a unified payment system. An important asset of MyCicero is that it has integrated urban and national lines.
Moovit | Provides users with real time transport information about public transport, news and alerts as well as schedules.
EMMA | Provides the option to subscribe to a mobility contract, charged €20 or €36 per month, with an unlimited access in tramways, buses and tramway-parkings.
MOOVEL | Compares the mobility offers of different providers in terms of price and duration – for the optimum route from A to B.
Uber | Provides instant taxi services and booking through their app.
CarUnity | Allows car owners to decide who they may rent their car to (i.e. their Facebook friends etc.)
DriveNow | Travellers can go from point A to point B, without having to return to their original point. Vehicles are allowed to park on public parking areas wherever contracts between municipalities and the company are available.
BlaBlaCar | As a private, Peer2Peer ridesharing platform, BlaBlaCar covers 19 European countries and allows drivers to share their rides through a friendly app. The service boasts that it bring people together.
SBB & Mobility | Subscription prices include fuel costs, mobility parking space, insurance, repairs, service, tyres, etc. Also, users can pay on a monthly basis and receive one detailed invoice.
Car2Go | Car2Go is available in more than 30 cities worldwide. Users are charged by a per-minute rate, and the offering includes discounted fixed rates applied to hourly and daily usage. Rates are basically all-inclusive and cover insurance, maintenance, rental, parking and fuel.
SHIFT | Customers pay on beforehand for monthly trip time (minutes) which they were then free to use on different transport modes. Additional trip time could be purchased if the customer ran out. Further to that, SHIFT aimed to use Tesla vehicles as their sharing mode of transport.
Communauto | Offers various monthly subscriptions as well as benefits for extra savings, such as making a family membership, better long distance fares and weekday use of vehicles at non-changing rates.
Cambio | Users receive the Cambio chip card by post. Booking their vehicles is easily done via
<table>
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<th>MaaS</th>
<th>Incentives and promotions</th>
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<tr>
<td>the Cambio app or website, for any duration necessary. At the end of each month, users receive a detailed invoice summarising the reservations made.</td>
<td></td>
</tr>
<tr>
<td>CapMetro</td>
<td>Users can turn their mobile phones into passes and they can use the app to buy passes for all services, on a pay as you go basis.</td>
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### 6.8 MyCorridor anticipated placement in the market

As MaaS continues to grow, there is a number of examples and schemes that integrate services and cater for traveller needs, some being more advanced and accepted than others, such as WhimApp, UbiGo, SMILE and HannoverMobil. Overall, the most successful MaaS schemes are experience-oriented, meaning they work to provide users with the availability to access information, tickets and payments through one app so that they experience transport in a new, seamless and comfortable way. More specifically, the MaaS schemes that have succeeded share the following common traits: a) Ticket integration - where one smart card can be used to access all modes that participate in the service, b) Payment integration – issuing a single invoice for travellers to have a summarised view of their travel expenses, c) ICT integration – information about transport modes are accessed through a single application or online interface. The combination of the above traits makes end users perceive transport in a different way - a more approachable, flexible, reliable and readily available way, resulting in user acceptance, user adoption and ultimately reaching to user loyalty.

MyCorridor anticipated to shares the above mentioned successful traits (ticket integration, payment integration, ICT integration) as they form the technological core of the project. Further to that and building on the existing schemes, **MyCorridor innovates in the field of personalisation, cross-border operation and traffic management services along with all other types of services.** MyCorridor provides extended euromobility through its cross-border nature and the Euro Mobility ticket notion (that will be achieved through the back-office synergies it has planned between the aggregator and the service providers); this will lead to seamless transport services across Europe for private users and for professionals, boosting the EU economy, minimising travel time, making smarter use of transport resources and facilitating international transportation of goods. As far as personalisation is concerned, MyCorridor provides users with the opportunity to receive personalised MaaS products according to their static (user profile, preferences and interests, travel preferences, access needs, etc.) and semi-dynamic profiling (tracking of their travel behaviour patterns).

This is an important factor that differentiates MyCorridor from other schemes and treats its users as unique individuals. Last, but not least, MyCorridor provides traffic management services in order to facilitate road users (either in private vehicles, public transport, VRUs or freight vehicles) when using the road. As a result, MyCorridor is a key participant in the decision making process of users, greatly affecting their options and decisions through the provision of updated, seamless, reliable and real-time information.

### 7 Traveller needs & priorities

#### 7.1 Introduction

As discussed in previous sections, significant effort is being made by stakeholders and academics in order to develop and apply MaaS and in order to consider the technological, cultural, social and
economic implications of MaaS. This seems a daunting task as there is little knowledge about the perspective of travellers and no clear view of MaaS acceptance.

Therefore, part of WP1 of MyCorridor was to investigate and summarise what is already known – as found in literature – and complement those findings with focus groups and a massive on-line survey, both sharing the same focus on MaaS acceptance amongst travellers as well as their views, needs, preferences and priorities. This feedback is very much essential for the project and core to the user-centric approach defined for the implementation to follow. Therefore, the outcomes of this step-wise process have turned by the MyCorridor Consortium into requirements (provided in the checklist of section 11 of this document) further being reflected in the Use Cases of the project (section 12).

### 7.2 Literature survey results

Travellers are the driving force for MaaS as their readiness and acceptance will determine MaaS growth. They demand safe, reliable, affordable and flexible transport services to meet their lifestyle needs. Within the concept of MaaS, those needs can be met provided a series of actions take place by all MaaS ecosystem participating forces.

When it comes to **time spent on transport**, it is found that Londoners lead the way, wasting more than three full days to congestion, with an average of 74 hours waiting in traffic in 2017 [32]. Paris follows with 69 hours while Geneva and Zurich follow with 52 and 51 hours respectively. Other EU cities that are recorded to lose significant amounts of time to traffic include Germany's Munich, Hamburg, Berlin and Stuttgart, the Norwegian capital Oslo, and Ireland's city of Galway. Travellers need good transport infrastructure that can be easily accessible from many points, gives them many options and helps decrease traffic congestion. They need solutions that are cost-effective, time-saving and reliable so as to avoid last minute changes. Therefore, authorities and transport service providers should establish a well-connected network that corresponds to the above mentioned needs.

The majority of travellers (78%) use their smartphones while on PT while 70% of Londoners are reported to regularly use apps to plan their journey [43]. A key success factor of MaaS is to use a **single account** to pay all transport services. A MaaS user does not prefer to have different cards, different accounts or individual payments – instead, travellers need one app and one profile through which they will search, plan, book and pay for all their transport needs.

A priority for travellers is **privacy** and **security of information**: only 57% of respondents would not mind sharing their personal data in order to get a better transport service [78]. This means that policy makers must protect travellers’ right to privacy, formulate appropriate laws and collaboration frameworks for MaaS participants to establish agreements and provide their services.

Travellers would prefer moving from one place to another in a convenient manner, therefore **comfort** is another need to be considered when providing mobility services.

Overall, travellers’ needs when it comes to MaaS are:

- User friendly, easy to navigate one stop shop for all transport modes via a single account.
- Secure payment environment.
- Reliability of information provided by transport service providers and MaaS operator.
- User info privacy.
- Multiple options for a journey.
- Ability to track their trips and expenses.
Further to the basic needs of travellers regarding MaaS, there is a number of characteristics that would additionally enhance their experience. Those include:

- Push information related to travellers’ profile, habits, likes, etc.
- Enhanced social interaction through vehicle sharing services.
- Ability to customise/personalise their profile and the services they get.
- Feeling of positive contribution to the environment.
- Value-added services to combine with their mobility.

MyCorridor has determined and used the following traveller profiles to better segment their needs and requirements and in order to later use as a first layer of personalisation:

**The “Daily Commuter”**
The daily commuter is a person who travels some distance to work on a regular basis. They mainly use PT services or private vehicle to get to their destination. In order to plan their daily journey accordingly, they need access to reliable, real time information and a series of cost effective and time saving solutions, especially during peak hours when most commuters make their trip. Based on their mobility habits (time, route etc.), daily commuters would prefer an interface with the following characteristics:

- Clean structure.
- Quickly retrievable alternate routes to their destination.
- Quick navigation, search, booking and payment.
- Added value services (i.e. information about shopping of their interest that are on their way to/from work to combine routes and make fewer itineraries).

**The “Tourist”**
Tourists are people who travel or visit a place for pleasure for a specific period of time. Tourists would greatly benefit from MaaS as it would improve their mobility in cities they are unfamiliar with. They usually use PT to get to cultural and historical places of interest and look for nearby restaurants and/or resting places. Added value services are useful to tourists as they are seeking to make the most of their time and combine sightseeing with other recreational activities (shopping, theatre, dining, etc.). At the same time, they usually begin their journeys after peak hours and they prefer economic options for their mobility (bus, tube, etc.). More specifically, tourists would prefer a MaaS solution with the following characteristics:

- Language availability.
- POIs depicted on map.
- Ability to save their favourite POIs.
- Links to POIs (museum schedules, etc.).
- Added value services (i.e. information about nearby shops, restaurants, museums, etc.) to combine as much as possible.
- Coupons and offers to purchase online and redeem during their stay.
- Search functionality.

**The “Businessman”**
This type of traveller is very comfortable with technology and wants to access services quickly and often at short notice. They mostly travel at short notice and for short periods of time, meaning they have no time to familiarise themselves with the city and its transport system. They seek ready-to-buy solutions, with minimum hassle and without time-consuming and unnecessary intermediate steps. Moreover, convenient solutions are preferred compared to more economic ones which may be more time-consuming, i.e. private car ride/hire as opposed to Public Transport. Also, it is necessary for them to keep track of their expenses as those are usually submitted to their employers.

- Language availability.
- Clean structure, to the point, quick to book and pay.
- **No push** information, unless very explicitly denoted.
- Transaction history.
- Immediate availability of services.

**The “Spontaneous user”**

Spontaneous users are people who do not necessarily have mobility patterns or specific mode preferences, but rather move in a flexible way. These people use transport services at any time of the day and perhaps seek to avoid peak hours for a more convenient journey. They are interested in opportunities, deals and attractive packages while they are on the go and their mode of transport can change randomly. Spontaneous users are usually students and young people who are very comfortable with technology and smartphones and are constantly on the lookout for new products and services that allow them maximum flexibility at a very competitive price. Their requirements for a MaaS interface can be summarized below:

- Attractive and “modern” interface.
- Easy to navigate and reach to solutions.
- Added value services according to their journey and location.
- Vouchers, coupons and opportunities.
- Option to share their routes and journey on their social media profiles.

**The “Mobility-restricted user”**

Mobility-restricted users are users who face a series of mobility limitations, not allowing them to fully experience the transport services provided. These users need tailor-made solutions and interfaces that are adapted to them and to their mobility restriction type, in order to make the planning process easy and make the journey experience good. It is important to identify the types of restrictions and match them to the corresponding needs for each user group [13]. E.g. a person with lower limb impairments would benefit from accessibility information whenever available (i.e. the way from the entrance of the railway station to the platform) or which services are providing which level of accessibility, but, also, from mobility options that would minimise walking distance while interchanging modes. As such, they need:

- Clear and compact interface (not busy), without redundant information
- Appropriate interface according to type of mobility restrictions (blind/partially blind people, deaf people, people in wheelchair, etc.) – Compliance to W3C WAI- AA guidelines as a minimum for any application provided for interaction. Specifically for travellers with cognitive disabilities, push services should be minimised and refer also to explicitly denoted needs.
- Options to customise both interface and content (appropriate for them routes, mobility products) to be delivered as per type of disability/mobility restriction.
  - People with mobility restrictions should be aware of the access level of the services provided/proposed to them. Level of accessibility should be acknowledged. Alternatively, there could be an option that accessibility restrictions are denoted in profile set-up and only matching services are proposed to the user with info schedules, itineraries, etc.

**The “Medium IT literacy user”**

The original user profile referred to “**Low IT literacy user**”. Still, as being revealed also during the focus groups, this needed to change to “Medium IT literacy level”, as users with total or roughly total lack of familiarisation with IT would not choose to use a MaaS application.

Medium IT literacy users are usually people of older age that are not necessarily very familiar with current technologies and applications, still they use them to a certain degree and for certain operations.
Current research has shown more than 60% of elderly people in the UK own smart phones [58]. This percentage is encouraging as it implies that the same users would use technology and smartphones for their travel needs, while in specific, a one-stop solution could prove to be more accessible to them and easier to accept and embrace. Within this concept, MaaS could enhance their quality of life, offer independence to elderly citizens and act as a travel companion to reinforce their sense of safety and security. Despite being relatively familiar with technology, this group still has special requirements when it comes to using apps:

- Self-guiding and self-explaining interface without side information to cause confusion (minimum need for push information).
- Easy process from searching to booking and paying operations.
- Clear fonts, bigger size to help them see better (W3C WAI guidelines apply herein as well).
- Good adaptability of the interface in tablets and smartphones.
- Clear “back” buttons to help guide them back when users get confused or change their mind.
- Precise and real-time information about mobility issues and weather conditions, as senior citizens avoid making journeys in bad weather.

In addition to the above profiles that were anticipated from the project beginning (part of the original DoA) and also oriented the focus group conduct (see section 7.3), there is another profile that was added afterwards, as it is getting more and more popular in academic/research but also commercial world, the one of the so-called "Bleisure traveller", that seems to have specific characteristics and refers to a quite important number of population.

The “Bleisure traveller”
A new type of traveller has emerged as a result of digitalization and growth in transport services – that of the bleisure traveller. The bleisure traveller is the person that combines business and leisure when travelling. The average bleisure traveller is either a corporate or government employee, with an age ranging between late twenties to early fifties [34]. Their needs within MaaS are a combination of tourists and business travellers, seeing as they combine the two profiles while on their trip. They need quick and easy solutions for their business time, but also added valued services related to their denoted hobbies, links to sight-seeing and maps for their time off at their destination. In specific, they would benefit from:

- Language availability.
- Clean structure, to the point, quick to book and pay.
- Added valued services but clearly related to denoted preferences. In this context, map links to POI’s (museum schedules, etc.) would be of their interest.
- Transaction history.
- Immediate availability of services.

To conclude, the above requirements per traveller profile should be taken into consideration when making tailor-made MaaS products, as they will greatly contribute to user acceptance and to the creation of new mobility habits.

7.3 Focus Groups results

7.3.1 Introduction

As part of the MyCorridor project, focus groups with potential end users (travellers/consumers) have been conducted in different countries (by the corresponding beneficiaries) in order to complement literature survey results and to collect additional data about public acceptance of MaaS. The scope of the focus groups was to explore this for different kinds of ‘ordinary’ users, who may have quite different
patterns of travel (e.g. global, national and/or local), or contexts (e.g. rural/urban), or circumstances (e.g. employment status) that might influence their experiences of travel, and hence, their attitudes towards change.

7.3.2 Methodology

7.3.2.1 About the focus groups

A focus group is a qualitative research method that aims to investigate understandings, feelings, views and experiences in a group setting by bringing together a small group of people to discuss a particular topic. It is facilitated by a researcher who can guide the questions discussed, but the aim is to engage the participants in talking to each other, comparing and contrasting different opinions, leading to a general view about areas of consensus and areas of difference. The aim of the MaaS focus groups was to find out how acceptable the ideas behind MaaS are to the public. In order to do this, we needed to explore concepts such as sharing transport instead of owning it, having a subscription and different ways of paying, and privacy and security of data. Participants were sampled in order to achieve a spread of user profiles according to several broad categories, with the understanding that one person could represent more than one ‘type’ of traveller. These categories were specified as follows, as per the key user clusters originally anticipated by the project:

- The daily commuter
- The tourist
- The businessman
- The spontaneous user
- The mobility restricted user
- The Low IT literacy user

Each pilot site was tasked with planning, organising and carrying out one focus group that lasted between 2 and 3 hours, at a local, easily accessible venue of the respective MyCorridor beneficiaries' sites. Focus group organisers were asked to ensure that the focus groups contained between 6 and 12 participants and to aim for a mix of genders, ages and income levels where possible, in addition to a mix according to the user profiles. The focus groups were conducted in the national language of the site in order to facilitate understanding and communication. Each focus group interview was audio-recorded and transcribed, and translated into English. To ensure that each pilot site maintained a consistent approach and were able to carry out the focus groups effectively, a methodology workshop was held, where partners in each of the focus groups conducting sites came together to discuss and finalise the focus group protocols and the interview guide. The specific protocol applied in all focus groups conducted in MyCorridor is provided in Annex 1.

7.3.2.2 Ethics

Each participant was given a participant briefing sheet that explained what the focus group was about, and what was going to happen (see Annex 1). This was given to participants in advance, and then again on the day of the focus group as a reminder. A consent form was completed by every participant. The consent process covered elements such as:

- Understanding what the focus group is about
- Understanding what will happen to the data
- Understanding how to withdraw consent
- Where and how to get further information
- How to make a complaint
- Confidentiality
- Recording
- How the results will be used
Consent procedures were developed in line with the guidelines in the MyCorridor ethics manual (D9.2) and the current data management plan (D2.1) [4]. Ground rules for the focus groups were suggested to guide the discussion and enable everyone to participate. Such ground rules included:

- **Look after yourself** – don’t say things if you are not prepared to discuss them further in the group. You may prefer to keep some elements of your personal experience private.
- **Look after each other** – listen to and respect each other’s point of view, even if you disagree. Feel free to challenge another opinion but do it in a polite and respectful manner.
- **Look after the group** – enable others to take turns to speak. Try not to interrupt or speak over someone else. Raised voices are not acceptable and can be intimidating.

### 7.3.2.3 The focus group interview

The participants of the focus groups were expected to be ordinary members of the public, who might know little about MaaS and may not have thought deeply about their transport experiences before. We anticipated that they may have varying levels of literacy and understanding of what the project proposed. We therefore used a scenario to enable participants to understand a range of options or possibilities, and compare these to their own experiences. This scenario was read to the group, and a series of prompt questions used to encourage conversation between the participants. The scenario used was as follows:

*Jane Howard uses the app on her phone to plan her journey from home to the meeting she has across the city. It’s not a journey she is used to. The app shows her several options. They are all different combinations of journeys. One combines walking to the bus stop with a metro journey. Others combine various routes on the metro. Another combines a bus journey with taking a bike for part of the way. And another gives the whole journey by car. Each take slightly different times. Each involve either ‘borrowing’ a car or bike – or taking the bus or metro.*

She thinks carefully about her day. She thinks about what she will be wearing, when she will leave and how long she needs for the journey, and the amount of exercise she needs to take. If she were disabled, she may also be thinking about her physical or non-physical limitations and this would be a factor in her choice. She decides to take the option of using a shared car. She walks to the car park, then uses her phone to obtain a code for her to unlock it and carry out her journey. She does not have to provide payment details, as she has already paid a subscription fee for this service. Off she goes to her meeting! She leaves the car in a public car park near her meeting venue and again uses the app on her phone to lock it. The app collects data about her trip, in order to help provide personalised suggestions for travel in the future. On her way back, she decides to borrow a bicycle instead of using the car, in order to enjoy a bike ride along the canal, and get some exercise.

The name of the woman in the scenario was changed in each pilot site to reflect a familiar name in each locality. Following the scenario, focus group participants were asked a number of questions which concentrated on several key topics of interest:

- **Human experience** (of MaaS and of travel generally), for example: their feelings; levels of comfort; confidence; skills
- **Conceptual**, for example: how are the concepts and ideas such as car sharing, and subscription services that lie behind MaaS received?
- **Technological**, for example: is the technology usable; acceptable; accessible to all?
- **Legal**, for example: do people have concerns about privacy and data sharing, and personal safety?
### 7.3.2.4 Analysing and presenting the data

The focus group data was subject to qualitative analysis techniques in order to assess the acceptability of MaaS to potential end users. Each focus group transcript was read by two researchers, who each categorised items in the transcript into codes arising from the text. These codes were compared and discussed, and cross-cutting themes identified. These themes were used in order to provide an overview of the acceptability of MaaS in respect of the four topics of interest: human experience; conceptual acceptability; technology; and legal concerns. Dialogue then ensued to agree the conclusions. For each of the four topics, direct quotations have been used to illustrate themes and to aid clarity.

### 7.3.2.5 Methodological challenges

Using transcripts for analysis that have been translated from other languages can lead to misunderstandings and loss of cultural references, but we endeavoured to ensure that the translations were conducted by those with a good grasp of both English and the language in which the focus group was conducted, in order to mitigate the risks associated with translation. All direct quotes are provided in the English translation.

Focus groups are a qualitative method designed to provide a range of responses to an identified issue. As such, they cannot claim to be representative of all views, or of all experiences. The more focus groups that are conducted can lead to methodological saturation (i.e. a position where no further new viewpoints are elicited) but with just six focus groups across Europe, this is unlikely to be the case here. However, we are confident that by sampling a range of user profiles, we are able to provide a range of viewpoints that can usefully inform the development of MaaS. In addition, this is the main reason for which, additionally to the focus groups, MyCorridor conducted an on-line MaaS survey in order to validate and extend the findings (see section 7.4).

### 7.3.2.6 Sample characteristics

Six focus groups took place in Greece (Thessaloniki & Athens), Austria (Salzburg), Czech Republic (Prague), Italy (Rome) and Belgium (Brussels). Each focus group lasted approximately an hour and a half, apart from the group in Prague which was shorter and the focus group in Athens that lasted more (about 3 hours). 44 persons in total took part in the focus groups conducted, and there were roughly equal numbers of women and men (Table 5).

#### Table 5: Number and gender of participants per focus group site.

<table>
<thead>
<tr>
<th>Focus Group site</th>
<th>Beneficiaries – Conductors</th>
<th>Females</th>
<th>Males</th>
<th>Undisclosed</th>
<th>Total participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salzburg</td>
<td>SRFG</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Prague</td>
<td>CHAPS</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Thessaloniki</td>
<td>CERTH/HIT</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Athens</td>
<td>CERTH/HIT</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Rome</td>
<td>TTS &amp; SWARCO</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Brussels</td>
<td>IRU</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>22</td>
<td>21</td>
<td>1</td>
<td><strong>44</strong></td>
</tr>
</tbody>
</table>
Most of them were aged between 25 and 54, with seven (7) young persons under 25, five (5) persons in the age group 55-64 and three (3) persons over 65 (Figure 10). One person declined to give his/her details and thus has been excluded from the following age distribution analysis.

Figure 12: Age range of the participants.

The majority of focus group participants were in full time and/or part time employment (72%). The rest of them consisted of 7 students, 1 unemployed and 6 retired persons. Household income levels varied, and there was representation from participants with very low household income (<€12000pa) and those on the highest income levels (>€90000pa). Income levels were not provided for participants in the Czech Republic, where it is deemed unacceptable to disclose income. Two persons were registered disabled.

The vast majority of participants owned their own car (only 15 people out of 44 participants did not) and their own bicycle (14 of 44 people stated they did not own a bicycle). Just four (4) participants were not users of PT (e.g. bus, train, U-Bahn or metro). Only one (1) person had not taken a vacation in the previous year, while 61% of the rest had been abroad for a holiday and 79% had taken a holiday in their own country. Some had done both.

From the analysis of the characteristics of the participants, it is evident that this sample represented most of the user profiles outlined by the project. Age was well distributed to cover different age groups in order to collect information from different generations and from users with different needs and expectations. All but one of the participants rated themselves as very confident or confident when using a computer. This type of participants was specifically pursued by the project, as the use and interaction with an app like the one MyCorridor aims to introduce presupposes a minimum level of familiarity with IT (similar with advanced smartphones apps).

7.3.3 Findings

7.3.3.1 Human experience

Participants were keen to talk about their own experiences with travel, which were largely routed in their own contexts of travelling around their own localities, commuting from home to work, or within their cities. Some participants were able to talk about their travels as tourists or as business commuters outside their own countries. What came through strongly from these discussions was the variety of
modes of travel used depending on the circumstances they found themselves in. Although most participants owned a car, the decisions they made on a daily basis very much depended on a wide range of factors primarily focused on where they lived and the availability and reliability of different options there:

As a user, for long journeys I use public transport because I am more comfortable and I can do other things while travelling. For short trips, I use my car, because living in a small town I still do not have the perception that I can get anywhere, I have more flexibility in the time of departure, and also because, if I walk to the bus stop or station, I am not entirely certain about when the bus will drive through the stop exactly (a long wait for the bus makes me choose other modes of transport for short journeys). (female, Rome, aged 35-44)

For me the only question is, what will it [MaaS] look like in rural areas. So, if you just live, as I do, away from any public transport connections, then a private car is always necessary and it’s difficult to get along without one. (female, Salzburg, aged 25-34)

...there is a huge difference between town and country. In town there are often plenty of options nearby, but in the countryside it is often quite laborious to get to the car-sharing locations. I’d like to use it, but I can’t see how it can be implemented. (male, Salzburg, aged 55-64)

When asked to voice their opinion about MaaS and share any thoughts they have about it, there was a variety of opinions from different aspects:

I think it sounds very practical and attractive. I would certainly consider using something like this, especially as I live in town. It would be a different story in my hometown, because there, there is only one bus stop every 30 square km, and I’m not sure how it could work, even with car sharing. We have always had two cars at home, otherwise you just can’t get from A to B. (female, Salzburg, aged 25-34)

As a young traveller, it is exciting to see new places and I am confident I will find my way. However, not knowing the local system and trying to figure out where to buy tickets from can be extremely time consuming and waste your time for nothing instead of visiting interesting places. This kind of app would help save time in an unknown place. (male, Athens, aged 18-24)

I believe the real innovation in this concept is the cross border nature of the system because it saves time, effort and perhaps money as well for the traveller who is visiting a foreign place and has no time or intention of familiarising themselves with the local transport system. On a local level, I don’t find it so innovative; I believe it is mainly an organisational issue of structuring the information and providing it to users, rather than a technological innovation. (male, Athens, aged 65 and over)

I have seen a similar concept in a movie; I do not remember the title but the plot took place in the future and they had this kind of transport system where users could access any car at an assigned parking place and use it. Other than that, I only know that my brother, who lives in (another European country) has used carsharing a couple of times to go to (another European country) for his work and PhD. He said it was easy to use and cost effective. (female, Athens, aged 25-34)

I think it’s great to have one card instead of all these different ticketing options, it would make it delightful to the traveller and easier (female, Brussels, aged 25-34)
Part of the discussion was centred around the difficulties experienced in living in rural locations, with less frequent or non-existent public transport, compared to their experiences of living or travelling in cities. Nevertheless, travelling in other places was no guarantee of a reliable set of options:

I was in [another European city] two years ago, and discovered that public transport stops running very early. I was amazed that so many people were queuing at the taxi stands, until we realised that the buses had stopped running. Really early, around 10.30pm. Then, I would have liked to not have had to search for ways to get back to my hotel, and instead have been able to use an app. That would have been great. (female, Salzburg, aged 45-54)

I am a very frequent traveller in the sense that I take at least 2 planes or trains a week but, as I am always in hurry for business trips, I would not use an app like that... until we solve a series of issues with institutions and until we invest in infrastructure that is prehistoric. I tried public transport before but I was always disappointed. (female, Rome, aged 45-54)

Other factors that made a difference to their decision making included: the way they were dressed; the weather conditions; the amount of baggage they needed to transport; whether they needed exercise; the time of day; the convenience; the reason for travelling; concerns about the environment; the amount of pleasure a method might bring; and whether they were drinking alcohol:

Today, I wanted to come with my bike, since my company is based in Tibrtina area, but the bad weather and my backache led me to driving here. (male, Rome, aged 45-54)

So long as the weather wasn’t bad, and that I wasn’t going around in an evening dress, I would have taken a bike because I like getting exercise and being outside in the fresh air. (female, Salzburg, aged 35-44)

When it's nice and the weather's generally decent, then I like to go by bike. It also depends on the reason for travelling, if it’s OK to be a bit sweaty on arrival and if you can dress in a way that’s suitable for bike riding. In a scenario it's fine if you are meeting up for coffee with friends, you don’t have to be perfectly turned out. (male, Salzburg, aged 55-64)

It also depends what you intend to do when you arrive where you're going. If it's just for an hour to have a coffee, or if you might be going home later on when it has already got dark. Like, at night, when public transport isn't as useful because it doesn't run as much. Or maybe when you have a glass of wine or beer and can't drive. Then, being able to leave the car in town and take a bike or public transport home would be really useful. (female, Salzburg, aged 18-24)

Considerations of personal safety were an issue for others:

...we have security problems, for example, it happens that bus drivers are attacked and that perpetrators remain unpunished because there are no surveillance cameras anywhere, not even in taxis. For all these reasons, I see the situation of not owning a car really remote. (female, Rome, aged 45-54)

Some participants felt that decision-making was also based on cultural norms, which were themselves influenced by the kinds of choices travellers had open to them:

Those who live and work in London cannot even use the car. In my opinion, it is a cultural issue... we must change our mentality. (male, Rome, aged 45-54)
A few weeks ago I was in Antwerp, I was surrounded by bikes, I had to cross and I asked myself how to do it because there the bikes have the priority, then bus, cars and so on. They take the bike regardless of whether it is windy, it rains while we think twice before taking a bike. (female, Rome, aged 35-44)

When I arrived in Rome 20 years ago I told my colleagues that complained too much about traffic “Well, you could take a bike”. They told me that “I had not realized that Rome is built on seven hills?” (female, Rome, aged 45-54)

Certainly, the problem is that cycling is very much seen as for tourism purposes, because we are in the mentality that the bike is used only on weekends for fun. (female, Rome, aged 45-54)

Participants tended to find that they usually had a good knowledge of the options for commuting to their place of work, study or for regular local trips and tended to use a particular routine, choosing options they already knew worked for them. Because of this, MaaS was not perceived as a helpful tool for everyday living, but more as a tool that could be useful when travelling abroad, especially if it could be operated in one’s own native language, as people often struggled with travelling:

I had some horrible experience in [another European country]. Travelling and booking tickets (especially train tickets) abroad can be a nightmare. You are not familiar with the language, the transport system, you just buy a ticket and get on the train, only to find out that this train goes to your destination but your ticket is for the slower train.. Then you need to pay fees etc. One app would save you all the trouble and negative experience in the country you visit. (male, Athens, aged 65 and over)

…for example in Budapest – at the beginning I didn’t know anything about the bus tickets there. There are ticket machines where firstly you really struggle to change the language, and then finding the right ticket wasn’t easy. On top of that you had to fill in what day it was and when you got on the bus because they were 24 hour tickets. It was just complicated. If I hadn’t had people there who I was able to ask how it worked exactly, it would probably have taken much longer. And there are often attractive City Offers, where you also get access to lots of museums, sightseeing tours, etc., for example, for students, which you couldn’t afford otherwise. (female, Salzburg, aged 18-24)

I was in (another European country) for a short trip with my friends. We wanted to use public transport for our journeys around the city and we looked in many places to buy tickets and understand which ticket is for what. I admit that we ended up using the public transport system without tickets because we could not figure out where to get the tickets from and which tickets to buy. If the app could help me access the right ticket quickly, it would be great and we would feel more confident (male, Athens, aged 18-24)

I would use it not for usual routes, for example for meetings with customers in other countries; when you start from a different level of knowledge, having an app that provides you different options might be useful. At the moment I speak for myself, for a business trip the most convenient option is to take a taxi. Despite having a car2go subscription, I have to deal with barriers like driving on roads that I am not used to, so I rely on a taxi service instead. So, a useful app that suggests alternative options that you do not know could be useful, even if I do not see the MaaS for habitual routes, because for work-related trips you always make the same choices. (male, Rome, aged 45-54)
I think that once you understand the most convenient combination of modes, you hardly change that. So, on unusual situations I would trust the app, but for usual journeys once you have understood what is convenient, you keep going with that. (male, Rome, aged 45-54)

Nevertheless, an app could also be seen as a disadvantage when travelling in unfamiliar places:

In my home country or home town I wouldn’t personally need it because I know all the routes and options, but abroad it could be an obstacle if, for example, the platform only features one service provider, but I am not aware of what other providers exist there. Then maybe, if you are in Crete and want to get from A to B, and the app only shows you one provider, but there are actually four different ones, then I wouldn’t know and can’t tell if the app suggestion is the quickest, if it’s good value for money, or if there are better options... (female, Salzburg, aged 35-44)

Some participants already had experience using other travel apps and their opinions of them had varied. While some seemed comfortable with using a variety of apps and were fond of the idea that MaaS can combine them into one, others did not find them easy to use:

I have to say that, basically, I have a problem with this kind of apps. Yesterday I tried to look up the timetable to get here from where I live on the Salzburg AG website. It was a total failure, although I have to admit that I’m not very good at this kind of things and a bit impatient. I’m a bit sceptical about the smartphone thing. I think that once people find something that works for them, then they tend to stick with that as long as that’s possible. (male, Salzburg, over 65)

Although flexibility to respond to different circumstances when choosing travelling methods was important to most participants, some participants, including those with a disability, pointed out the need for them to know exactly what was going to happen, and be sure that services were reliable:

My trip must be organized. I have to make decisions, have information and accessibility. I can never be spontaneous and this is what I am missing out on. (male, Thessaloniki, aged 45-54)

7.3.3.2 Conceptual acceptability

One of the key concepts behind the development of MaaS is that of encouraging travellers to become informed about the variety of ways in which they can travel, including carsharing, in the hope that people may be persuaded in future to rely less on car ownership, and more on car sharing and using public forms of transport. Car sharing as a concept was greeted with mixed feelings. Some participants stated that they would be willing to give up their cars in an ‘ideal’ scenario, where public transport was plentiful, reliable and convenient, but expressed scepticism that this could ever happen:

I see not owning a car a very remote possibility at present. I see it more feasible... where there are more adequate infrastructures. For example, if I think of London or Paris, with their metro offer, you can also afford to realize the congestion charge because over there you can count on a valid alternative of buses, metro and so on. (female, Rome, 45-54)

Although the concept of MaaS sounds very good as it would facilitate ticket acquisition, I find carsharing with someone unknown to be weird...(male, Brussels, aged 35-44)

The mentality [here] is: I have my car because you never know. If I need it, it is there! When the infrastructures become more adequate and I have rented cars at an acceptable walking distance, then I could consider selling my private car. (female, Rome, aged 35-44)
As a user, I always hope that in the near future there will no longer be the need for a private car, but the reality is unfortunately another. (male, Rome, aged 35-44)

I would never share my car with anyone but I would gladly use the opportunity to share another car with other people, even if I don’t know them. For me, my car is linked to my independence and I also admit I enjoy driving. (male, Athens, aged 65 and over)

Again, it really depends on the availability. Like we’ve already mentioned, when I need to go somewhere at the last moment, and I can only get there by car, if none are available, that would be stupid. So, if there was a guarantee that a car or a bike was available when I need one, and the distance to the car pick-up point isn’t too far and not too complicated to get to, then I might well use it. (female, Salzburg, aged 18-24)

Other participants stated that they would retain their cars, as flexibility was important to them, and shared that although they may consider using other forms of transport more often, they believed there would still be circumstances where they would want to have speedy and convenient access to their own car. Issues of safety were also raised.

I think it always comes back to flexibility. Especially these days, when you’ve got a really busy day, it is difficult to have to look for a pick-up point to see if there is a car free anywhere. And that’s also the reason why I like the feeling of having a car at home and knowing that I can get in it at any time when I need to go somewhere. (female, Salzburg, aged 25-34)

One participant pointed out the enjoyment that driving as an activity in its own right gave him:

I drive around a really beautiful country area at the weekends (Kärnten), so I couldn’t imagine giving up my car. (male, Salzburg, aged 25-34)

There was a feeling that in order for car sharing or giving up car ownership to be acceptable, cultural attitudes would need to change, but that a MaaS app could help if the right infrastructure was in place:

There is a need for a cultural change from people, but mainly there must be infrastructures, because if people see that usability is comfortable, safe and available, they change mentality. (male, Rome, aged 35-44)

I would like to use an app like this because it would help me to limit my CO₂ emissions. 20 years ago it was inconceivable that you could leave your car at home when you travelled to Vienna. Now everybody asks, “who on Earth would drive to Vienna?” Things have changed. If you could use an app like this, and in five years it changed people’s ways of thinking, like it changed before over 20 years, then I’d find that cool. (female, Salzburg, aged 45-54)

Some participants thought that providing an incentive would be a good idea in order to encourage that kind of cultural change, and made suggestions as to how that could be achieved:

Then you will probably have to offer incentives for people to use it. Cost saving, or for example filters, or that it offers you the most CO₂-friendly route, the fastest route, the cheapest route... I personally would find that very important. (female, Salzburg, aged 35-44)

I’d like to get a comparison which showed me how much I’d save if I gave up my car. Because... in addition to the cost of keeping your car which you have anyway, you also have to buy a seasonal bus ticket. But when you consciously choose not to have a car and you can calculate the cost of
public transport all together, then you’d see that it’s significantly cheaper. If in an app like this people could see what the cost of a family-sized car would be and what they are for public transport, then that would be a eureka moment for lots of people. (female, Salzburg, aged 45-54)

If you are frequently using this card, you should, at some point, get bonuses, discounts or to give you a free parking spot or even give you extra time in parking spots. (male, Thessaloniki, aged 35-44)

As a user, I would also like to have incentives (not only of economic nature), since I believe the health of the planet is a matter of all our children’s lives. (male, Rome, aged 45-54)

Such integrated mobility services could be provided also to employees instead of public transport on a monthly transcription or company car. (female, Brussels, aged 25-34)

Participants of one group discussed the concept of car sharing using privately owned cars, which, although not proposed to happen with the MaaS platform, nevertheless provoked a particularly negative reaction:

No, I wouldn’t do it. I am afraid that someone could damage my car. What happens if they steal it? Such a service is very advanced for me! It’s easier to take someone where he wants to go instead of give him your car. I don’t think as a society we would do it. (male, Thessaloniki, aged 45-54)

If someone gets a ticket or crashes my car? What would happen then? I don’t have a problem to give the car to my children but to a person that I don’t know, no. (male, Thessaloniki, over 65)

If I was driving, I wouldn’t have a problem to share my car with other people. But someone to drive my car without me, no! I wouldn’t mind using someone else’s car, but not mine. I won’t share my car. (male, Thessaloniki, aged 55-64)

As found in another group, carsharing with complete strangers seemed a distant idea for a lot of participants, especially from female participants perspective, for security reasons. However, a rating system that would rate and evaluate people as passengers and drivers and allow travellers to accept or reject carsharing would make them feel more positive and friendly towards the notion. Another key concept involved in MaaS is that of paying for travel through a subscription. Participants had many questions about how this might work, and drew on their own experiences of Internet shopping to make sense of some of the options. These previous experiences did not always lead to positive attitudes as there was a perception that using one platform did not always give you access to the best or cheapest deals and cost was a primary consideration for many in their decision-making processes:

Now that I think about it, at the beginning I really liked the idea, especially because you could buy your tickets there. Now I have thought about it a bit, and considered what happens in other areas when lots of things can be bought over one platform, such as with Amazon.... and I don’t support that at all. For various reasons. I prefer to use specialists, to go to a book store or something, for that reason I now consciously avoid Amazon. (male, Salzburg, aged 25-34)

Or that individual companies start offering special offers outside of the platform. That happens on booking.com. It means that you also have to look up the hotels, because sometimes when you book over a hotel website it is cheaper. That makes things complicated again. It’s definitely difficult. (female, Salzburg, aged 25-34)
For me, too, the cost issue is crucial. This is mainly relevant for me when traveling. Of course, I want to get the best price. (female, Salzburg, aged 35-44)

In one group, the motive to use the app was discussed. Participants stated that key motives for them to try the app are: service availability, as in to find carsharing options readily available, nearby and having one ticket for all modes. In addition, some participants felt that any subscription would have to enable travel to be at least the same price, or cheaper than the cheapest deals on offer elsewhere, and worried that if a subscription was paid that infrequent travellers, or those who may not know in advance their travel patterns, might lose out, as sometimes happens with mobile phone deals:

If I want to travel once a year and I have to pay every month this is not in my favor. (male, Thessaloniki, over 65)

What I understand for subscription is like Forthnet [Greek telecommunications company]. You pay it every month. You may never use your phone but still you pay it every month. (female, Thessaloniki, aged 55-64)

For me, it’s more sensible to have no subscription and to pay when you want to use the card. Because it binds you and you may not use it for a long time. (female, Thessaloniki, aged 25-34)

Having a subscription and not knowing how long I’ll use I don’t think that it will be acceptable to the public. (male, Thessaloniki, aged 45-54)

Nevertheless, not having to carry money was seen to be a positive of the MaaS concept:

I think this card is useful because you don’t have to have money on you. You are able to use any kind of transport you want without being anxious that I have enough money on me. I can use the card to take a bus and later maybe a train without thinking about it. (male, Thessaloniki, aged 45-54)

Although some participants were wary of getting the best deal by only using one app, others appreciated the idea that it would bring lots of services together, without the need for using multiple platforms or websites, which could take the worry and stress out of travelling, particularly when travelling abroad. One participant wondered who would be accountable and take responsibility for resolving issues, however, when travellers experienced problems during their journeys.

It would allow me to organize a trip without worrying about how to travel. It is not about holidays, health issues or studies. It is about absolute service. (male, Thessaloniki, aged 45-54)

Well, I think an app like that would be very convenient, because sometimes clicking through several apps can be very complicated, because by the time you get to the fourth app, you’ve forgotten what the first one said. So I don’t use many apps like that. (female, Salzburg, aged 18-24)

Would be great if the app also showed me tickets for museums and other interesting places, such as museums or galleries, where travelling abroad. (male, Athens, aged 18-24)

Basically, I think this app would be cool because, now when I book a trip, then I have the problem that I have to google where the nearest airport is, and write everything down, with a few different options that come up, so it’d be cool to have an app where all of that comes together. At least the option to look these things up. You can always decide to do things differently. (female, Salzburg, aged 25-34)
I always notice that in different countries, everything is different; how and where you can get your ticket, where the central public transport zone is, what tickets you need there. There, an app like this would definitely be helpful and make things easier. (female, Salzburg, aged 35-44)

The disabled participants were keen to stress that the app or card should be as inclusive as possible, and therefore should include services that could offer more choice for those with mobility problems, and ensure that those with different types of disability are able to use it:

I have a disability and I can’t use a bike, a motorcycle. The issue of the card is limited. Serving is a given but you should have more options for the disabled. More taxis or cars for disabled people. The opportunity that this card gives you should be for everyone... What happens to a disabled person is the same for other users. It should be compatible with other users (i.e. if someone is blind there should be a person who can help him so he can have all the information he needs)/ I don’t know if there is a possibility with this card to do something like that. But it should be compatible for people with disabilities, deafness, and blindness. (male, Thessaloniki, aged 45-54)

7.3.3.3 Technology

Participants of the focus groups discussed the technology involved in delivering MaaS and many felt that it should be both a smartphone app and a card (voucher), to enable people to have the choice of how to engage with it, and be more inclusive to those who were not familiar with using smartphones.

I believe also that someone who has this application should have a card because he may go to a place and he may not be able to use the application, if someone is elder also I don't think that he could use the app but he could use the card. (male, Thessaloniki, aged 35-44)

One concern that I have is in terms of interoperability, I think it is great if you can have your one app or one pass for different kinds of services and would be nice to use it anywhere, could be one app or one card to travel all across Europe. (female, Brussels, aged 25-34)

I am used to traveling using a smartphone, however, elderly people may be cut off if a mobility service is based on the use of smartphones only. When elderly people stop driving and start using public transport more, in some cases they may not have direct access to all the information they need to organise their journey; therefore, they could be forced to take a taxi sometimes. In any case, those who are frequent travellers can organize themselves quite easily, but you should consider the needs (and limitations) of all user groups. (female, Rome, aged 45-54)

For those familiar with smartphones, there was still a sense by some that they would need to become familiar with the app in order to use it effectively. This may pose a problem for some users if the app is used mostly for non-routine travel as envisaged by many participants:

Yes, I think that an app like that would be convenient, but somebody would have to show me how to use it. It’s about a certain degree of familiarity. If I used apps all the time, I would probably feel more comfortable about using a new one. I’m of an age where I’m happy to have WhatsApp, but that’s enough for me. (male, Salzburg, over 65)

I think it is really important for the app to be user friendly. Because young people use apps like that completely differently to 50 year-olds. Once I looked up a journey from Salzburg to Grado with
public transport, and it wasn’t easy. Then my son-in-law helped me, and I got there, but with all the connections... I knew that the connections were there, but finding them wasn’t so easy. Young people do the searches differently. And also, the language was a barrier. My son-in-law can speak Italian, so it's completely different for him. I got there in the end, but it was a challenge. It's all about how should you search, and what filters should you use so that you find the right option for you. (female, Salzburg, aged 45-54)

In addition, it was stated by some that relying on a smartphone was not helpful in case the battery went flat. Some participants saw the possibilities of linking an app to other technology they were using, or integrating other services into the app that might help in the decision-making process about travel choices:

I think the bit about how much activity your day involves... so somehow integrated into the app: “what am I doing today, how much would that count in the way of exercise if I travelled on foot, by bike, etc.?” That could be combined with people's fitness tools. I would also go by bike, but the question I always have in the back of my mind is, if she doesn't know the route, how does she know where to cycle? Could a satnav be integrated into the app that is suited to bikes and cars? (female, Salzburg, aged 25-34)

When presented with the three key traits of the intended MyCorridor service (personalisation in added valued services, cross border service, traffic management services) and asked which of these traits would satisfy them the most, the vast majority of participants replied traffic management services and cross border services. Another key trait that would encourage travellers to use the app is reliability. Most seemed keen to try the app but stated that if they notice unreliable information or inaccuracies, they would discontinue it. They all pointed out that valid and correct information about available routes and traffic would help them make better decisions on how to move around.

Other suggestions on how a MaaS app needed to operate included providing real-time information so that only services currently available were offered, and that live times could be provided. Filters were deemed necessary in order to control the amount of information being processed and tailor content to user preferences:

Well, I also wanted to talk about the availability issue, that it can make things harder if what is shown on the app is inaccurate and you can’t rely on it. And, it’s just a small thing, but I can imagine that when I just want to quickly see when the bus comes to the stop that’s just 20 meters down the road, and I type it in the app and have to spend time sifting through the information because five other options with car-sharing, bikes, walking and trains are suggested, and all I wanted was the bus timetable... that could be tedious. Then, it would be good to have a filter, so that the app would only show you bus journeys for example. (female, Austria, aged 18-24)

Well, I use a multimodal app, and it’s great when you can see multiple options at the same time. What would be useful for this app would be that only those options that are currently available would be offered. If no car-sharing is available, I would expect not to have that suggested as an option. (male, Austria, aged 55-64)

A visualisation of the route to be taken was also suggested by one participant:

I’d like to be able to see a visualisation of the routes. So that you can see on open street maps, or whatever, what route you need to take from A to B. For me, that’s always important because I always like to use maps, and I don’t know if it’s important to other people, but for me it would be
attractive. Whether I’m in town or in the country, I’d like to be able to see where I need to walk, where the bus stop is, where the train station is. It helps you to remember. (male, Salzburg, over 65)

One participant thought that the app would encourage an over dependence on technology which was not acceptable:

This idea does not suit me because we become completely dependent on electronics without the possibility and necessity to think independently. (male, Prague, aged 45-54)

[The user] ceases to think, but adapts to someone who plans on her behalf. On the one hand, it "simplifies life" - but from my point of view it takes the freedom of choice away. (female, Prague, aged 55-64)

Another aspect for consideration when using the app technology is how payments are made. Most participants were already making payments online for existing services such as travel tickets or online shopping and so did not see any issues with making payments through the app in terms of the technology:

I don’t have a problem paying through an app, because you already do this, for example with the Westbahn, when you buy a ticket online. So, it doesn’t really matter if you end up paying everything via an app, or through the separate providers. (female, Salzburg, aged 25-34)

...with online shopping it isn’t any different. I also shop online, so I would definitely also use the app. The question is, how would the billing work? Would things be charged through your mobile phone bill? Or would the shop use other payment methods, like when you pay by direct debit or credit card? (male, Salzburg, aged 55-64)

Approximately all participants found the “one-stop-shop” idea to be very useful, time saving, convenient and helpful.

However, participants stated that they would require real-time information about their usage and the associated spending, much like a banking app, so that they could keep track of the cost of their services:

But what is really important is that you can consult your history, so you can clearly see what payments have been made, so you’ve got a kind of warning system, where you can set it to, say when you reach 10 Euros, send you a notification. That way you would have an overview without having to directly check your history, and you can keep up with what is going on. (female, Salzburg, aged 25-34)

7.3.3.4 Legal concerns

Although participants largely felt comfortable with paying online (this may not be the case for medium IT literacy users), there was divided opinion about the use of their personal data. Some participants felt very uncomfortable with the idea that the app would be able to track where they were going and what they were doing:

How many of us are thinking about the fact that there is always a way to know where we are and what we are doing? (female, Rome, aged 45-54)

The first few times I was surprised that Google knew where I was and I was anxious. (female, Rome, aged 35-44)
I do not want anyone else to know when and where I am going. (female, Salzburg, aged 35-44)

Other participants, while not altogether comfortable with the amount of data stored about them, demonstrated a certain resignation to this:

I don’t know. For example the Google with the GPS knows where I am. Ok, for me it’s a problem but still I have to use it. (Male, Thessaloniki, over 65)

Whenever this discussion comes up, I’m fully aware that my data is accessible to others, but I have to say that I don’t particularly want that. And also, when it comes to payment methods, I know that things are moving away from cash based payments, and on the one hand, I don’t have a problem with that, but on the other I don’t personally want to be part of that. So, what’s the cost of taking part? I don’t think it is possible to not have apps on your mobile, and to not use these payment methods. It’s not possible to avoid these things completely. What would be important for me, would be that when you have service providers like this... that there is competition... that you have the ability to say: “I want to use this provider, or that provider. That it isn’t a monopoly. And also that payment methods are not in the control of one company.” (female, Salzburg, aged 45-54)

In Athens focus group, participants were more comfortable sharing their data because they believe all information is already easy to find and anyone can use Google and social media to find out more about them. The one thing they would not want to share is their finger print. As some participants stated:

“Google already knows everything, therefore, so what?” (female, Athens, aged 35-44)

I would also see it as security, if something happens to you, the police can track your last moves. (female, Athens, aged 18-24)

What is happening to the data was also important to this participant who questioned what accountability would be in place for the use of the data:

I do like my freedom and privacy. Data collection and control options are working as “The Big Brother is watching you”. As soon as some information is stored about each trip - who is checking for data misuse and who watches watchdogs? (female, Prague, aged 55-64)

Particularly important to these participants was that this data was not used for other purposes, such as tailoring advertisements not related to their travel:

If we give our details, will we have ads related to our needs? We have to consider the policy we will have for your cookies. (male, Thessaloniki, over 65)

as a citizen, no problem to give personal data but for a service of this kind, I do not want to have even a single notification or e-mail that has nothing to do with the service. I want to have zero advertising. (male, Rome, aged 45-54)

A younger person saw this as a usual consequence of using a smartphone stating:

But this is something that happens all the time. Even if you have your phone nearby and you are talking, the microphone is on. Then you will be able to get a relevant advertisement later. Everything is recorded, so why bother? (female, Thessaloniki, aged 25-34)
Other participants pointed out that our data is already being used, and so there is no point worrying about it:

Yes, I think the whole idea of state surveillance shouldn't be over-exaggerated. It's just the case today that our movements are known and are tracked in many different ways, and I wouldn't give too much weight to it. It's an aspect of our times that we have to live and get along with. (male, Salzburg, over 65)

So I think, since my cell phone already tells me exactly where I am and where I am going, I do not really care. (female, Salzburg, aged 45-54)

Then there's the question of data storage. Can it be traced back to a person, can we know who did what? But that could be beside the point, because you're tracked through your mobile anyway... everything that you are doing... you're always tracked by GPS when you're out and about, and always leave a kind of a trail behind you of where you have been. I think it would be better to be anonymous, so that you can't tell who was doing what. (female, Salzburg, aged 25-34)

Another participant returned to the importance of tracking their spending:

Regarding the data recording, I wouldn't worry much about that. You're tracked on your smartphone everywhere anyway, so I wouldn't worry much about it. My only concern is that in bigger cities like London, there already are similar underground cards with tap-and-go systems which you can load credit onto, and I especially noticed that in London it quickly gets difficult to keep track of things. So like, how much money have I just spent on public transport? I think payments have to be really clearly itemised if you want to check how much you actually have already spent, and how much each trip cost. Obviously, you should be able to see all of that on the transport options overview, and also when you want to look at it later, as is the case with Online Banking, that everything is itemised. (female, Salzburg, aged 18-24)

One participant pointed out that it was particularly important to keep track of spending for security purposes:

Exactly. And also in case somebody else used it, so that I'd know someone was using it. In case it was hacked or something like that, so I can be sure that nothing goes wrong. (female, Salzburg, aged 25-34)

7.3.4 Discussion

7.3.4.1 The importance of geography/context
As the extracts above demonstrate, there is much variability and diversity in people's experience in travel, complicated by differences in approach when considering different kinds of journeys, for example everyday routines compared to holidays or business trips in unfamiliar locations. Choices are enabled or constrained by where people live, be it rural or urban conurbations, with geographic variability extending to types of local terrain, for example, hilly versus flat landscapes to navigate. These choices are further shaped by the transport infrastructure in place and the reliability of local services. People spoke of their options being limited in some places but in different ways. In and around Rome, for instance, public transport was deemed to be insufficient to provide reliable services and so a car was essential. This was compared to London, where PT was deemed the best way to travel, as travelling by car was very difficult. This poses a considerable challenge to MaaS systems which will need to find ways of incorporating local variability across the cross-border corridor.
7.3.4.2 Choice and control
In addition to choices being constrained or enabled by local circumstances, people exercised a great deal of variability in the decision making based on the circumstances of their daily lives. As the participants explained, their decision making was complex and not based purely on the availability or otherwise of transport choices, but based on factors such as their lifestyle, the different activities they were involved in, the way they were dressed and often spontaneous and random changes and factors in their decision making such as the weather. Participants wanted to be in control of what was happening in terms of their journey and make the choices that were right for them, and their circumstances, at a particular moment in time. To achieve this level of flexibility would require significant tailoring for an individual, requiring ways of navigating an interface that could enable users to quickly reach the information relevant to them, without having to sort through lots of erroneous and unnecessary information. Users’ interaction with the MaaS platform should take these multiple needs into account in order for the participants to find the app useful and useable to their individual circumstances.

7.3.4.3 A sense of resignation
To achieve the flexibility needed to offer personalised and tailored choices, users demonstrated an awareness that any platform used for MaaS needs to be able to access information about its users. Nevertheless, many participants expressed concerns about the way their personal data might be handled, who might be accountable for any problems and wanted a reassurance that their data would only be used for the purposes of enabling them to use the app in the way they wished. Previous experience of apps and online companies had led to a dislike of the processes involved; yet, focus group participants displayed a certain resignation towards the use of their data. Although often uncomfortable about their habits and preferences being recorded, participants stated that this seems inevitable in order to use such services and is something that they simply have to ‘live with’. This implies a kind of trade-off. This poses a challenge for MaaS in the sense that, although people may seem familiar with the data sharing and payment implications of smartphone technology and may agree to terms, there is a resignation to data being shared, rather than a positive approach. MaaS operators should not assume that people are completely comfortable with sharing their data and to take steps to ensure people are informed about what happens to their data, that it is only used for necessary purposes, and that there should be accountability processes in place. Further to that, the operator that handles the data should comply with all legal and transparent procedures so as to ensure trust that user data will not be used for reasons other than to offer them tailor made solutions.

7.3.4.4 Ensuring inclusive practices
For the MaaS interface to be a success, it will need to attract people with a wide variety of circumstances. It is evident from the diversity of views presented in the focus groups that there are concerns about wider issues than what form of transport to use and how that is paid for. There was concern that some people may not be able to use the app or may not possess or be familiar with using a smartphone. These people have the potential to be excluded from the choices that others will be able to access relatively easily. Concerns were also raised about cost. It was clear that people wanted to seek the best deals and were worried about missing out on offers and added value services. If the services of MaaS prove expensive, this will surely exclude those on low incomes from participating and would especially exclude younger people and students as well as older people who are likely to have lower incomes. Participants expressed worries about those with disabilities, ranging from motor problems to deafness and blindness. Suggestions were made that additional choices may need to be offered for those with disabilities such as hiring wheelchairs or the provision of helpers to assist disabled travellers. While these may reflect larger issues around the provision of the infrastructure, they are nonetheless important issues for MaaS to consider. The potential of technology to exclude rather than include and exacerbate existing inequities is large.
7.3.4.5 Travel as an individual concern rather than public good

It was clear in some of the responses to the focus groups that there is the view that technology enables people to make choices that reflect their personal concerns and lifestyles. In some cases, travel may be planned with environmental impact in mind; however, the decision making process is a complex process that depends on lifestyle, context and circumstances. This indicates that travellers will mostly use MaaS to accommodate their own needs and preferences, rather than those of the general good. Providing options such as carsharing and better PT may encourage people towards making choices that are better for the planet, air quality and the environment but this is by no means a given and the availability of choices may entrench people further into individualised behaviour. Some participants requested the opportunity to make environmentally aware choices, but there was little hope currently that such an app would lead people to give up their cars. What is needed is a wider cultural change which, although possible, will take time and calls for different approaches in different contexts. Incentivisation is necessary not only to motivate people to use the app but also to guide them into making more healthy decisions, rather than decide solely based on convenience or cost. A challenge is to ensure these choices are acceptable to the public in terms of personal safety, cost, and flexibility.

7.3.4.6 Most attractive and satisfying MaaS traits

Another issue that was raised in focus groups was the traits that would make MaaS attractive to travellers and would work as motives to use the single app. As stated by participants, when selecting which mode of transport to use, availability is very important. This means that participants mainly choose to use that mode of transport which is closer to them and more readily available. MaaS should take this into consideration and research the flexibility of the transport network for all modes of transport. Further to that, traffic management services and cross border services were perceived as the most valuable traits of MaaS, explaining that this information would help them in their decision making. In order to continue using MaaS, participants stated that reliability of the provided information is the key, as any inaccuracies would encourage them to discontinue using the app. The above mentioned are characteristics that MaaS should gravely consider in order to find its place in the market and meet customer needs.

7.3.4.7 Sharing approach and ‘one stop shop’

Despite the fact that MaaS aims to reduce vehicle ownership in favour of vehicle sharing, participants demonstrated a hesitation towards the notion. This may be attributed to the fact that their own vehicle is seen as a very personal item and sharing it with unknown people feels intrusive. Nevertheless, they stated that using a vehicle that is also available to other users is a more friendly idea and one they could potentially adopt, if those vehicles were easily accessible to them. Therefore, launching a “communal vehicle system” with vehicles that belong to companies or municipalities may be the appropriate way to proceed (though this is upon the MaaS platforms authorisation). The ‘one stop shop’ was also discussed as a new concept in transport with participants stating it would help them save time and effort. However, interoperability was a concern and the provider should ensure that all necessary steps and standards are applied so as to offer interoperable services with access from anywhere in the EU.

7.3.5 Conclusion

Although participants of the six focus groups conducted across Europe were interested in the potential offered by MaaS, a number of challenges still remains to be addressed, the most important being the ability of MaaS to incorporate user preferences and suggest tailor made options so as to enable, rather than exclude, travellers. If one platform is to take multiple needs, preferences, experiences and contexts into account, consideration must be given to the challenges it poses for technology, for those providing public transport infrastructure and for companies that should collaborate rather than compete. It may be that the development of MaaS is limited until the wider structural and social factors interacting with people’s travel experiences and choices can be taken into account. When considering the utility and
potential of MaaS, the focus group findings indicate that data privacy and financial benefits should not be the sole considerations, but focus should also be placed on how the technology can contribute towards a wider cultural change that can consider transport as a public good and a means of promoting a holistic and inclusive approach for the wellbeing of citizens.

### 7.4 On-line survey results

#### 7.4.1 Introduction

An online survey was conducted in order to complement the above qualitative outcomes emerging from the focus groups. The online survey aims at further investigating and capturing more tangible findings regarding MaaS acceptance, traveller behaviour, needs and priorities in a more systematic way that would be easier to reflect in the anticipated implementations. The on-line survey was conducted through Sosci survey (https://www.soscisurvey.de) and was completed by 142 participants from different countries and of different age, gender and background. It was promoted through the project website, social media and the Consortium beneficiaries' individual networks. The content of the on-line form is provided in Annex 2 of the current document.

#### 7.4.2 Results

##### 7.4.2.1 On-line respondents characteristics

As depicted in Figure 13, the combined majority of age groups that participated in the survey belong in the 25 – 44 age group, which is equally shared among the two age groups (25-34 and 35-44 accordingly).

![Figure 13: Age distribution of online survey participants.](image)

Figure 14 depicts the gender distribution amongst the participants, showing that the majority of respondents were male.
As the questionnaire was shared online, the respondents come from various EU and non-EU countries, as shown in Figure 15. A large distribution of country backgrounds is beneficial to the survey results as it includes people with different mentalities, various lifestyles and different levels of conceptual and technological readiness. Most participants came from Greece, Italy, the UK, Austria and Netherlands. This is considered a good distribution amongst European countries as transport infrastructure and services are very different from one country to another.

Participants were asked to state their employment status (more than one option was available). Figure 16 depicts the employment status of the participants.
Figure 16: Employment status of online survey participants.

Figure 16 shows an interesting fact within the population responding. Approximately 75% of respondents state they are full time employed while there is also a 73% statement concerning the status of part time students. This indicates that a large number of professionals may also be taking part time courses either to pursue an academic degree or a professional certification.

As far as travelling is concerned, when asked if they have taken a holiday in the past year within their country or abroad, 49% of participants responded that they have taken a holiday in their own country while 51% responded that they have travelled abroad for their holidays in the last year. This emphasises the need for better mobility services, both within a country, on an urban and sub-urban level, as well as on a cross border level, to facilitate travellers. Further to that, a 29% of the respondents stated they have an annual income of 12000 – 36000€ which correlates with the age distribution depicted in Figure 13. Also, of the survey sample, only 2 people out of 142 stated they were registered as disabled.

Table 6: Annual income of participants’ household.

<table>
<thead>
<tr>
<th>Income (euro)</th>
<th># of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 12k</td>
<td>10</td>
</tr>
<tr>
<td>12-24k</td>
<td>20</td>
</tr>
<tr>
<td>25-36k</td>
<td>21</td>
</tr>
<tr>
<td>37-60k</td>
<td>40</td>
</tr>
<tr>
<td>61-90k</td>
<td>18</td>
</tr>
<tr>
<td>Over 90k</td>
<td>14</td>
</tr>
<tr>
<td>Not answered</td>
<td>0</td>
</tr>
</tbody>
</table>

7.4.2.2 Mobility habits

Participants were asked information about their vehicle ownership. 70% of participants stated they own a car while only 12% own a motorcycle. An impressive 70% stated they own a bicycle, making this a highly used means of transport.
Participants were also asked to state their preferred mode of transport when travelling locally or on a cross border level. Figure 18 depicts their responses. It is observed that on a local basis, most participants prefer to use their private vehicle while when abroad they prefer to use public transport.

When asked about their mobility habits in terms of public transport use, the majority of the respondents (55%) replied that they rarely use public transport while 43% stated they use it often. Only a small percentage (2%) answered that they never use public transport. Their reasoning for this habit is attributed to the bad network of public transport, the low level and inconvenient services it provides.

As far as mobility schemes are concerned, 76% of participants are familiar with mobility schemes like car/ridesharing and carpooling, although only 34% have used it. Out of those who have used it, 31% have used it on a monthly basis while 15% have used it on a cross border journey.

An important trait that characterizes the survey population is the fact that 80% consider themselves to be very confident using a computer, while 20% feel confident using a computer. Only 1% has stated they
do not feel very confident when using a computer. This is an important finding as MaaS will be delivered to users through smartphones meaning that comfortable use of technology is essential for MaaS to be accepted. Additionally, 66% of participants stated that they use web/mobile applications to support their mobility. Some of the applications used by most participants are: Moovit, Google Maps, Waze and BlaBlaCar. However, almost all participants that use an application to support their mobility, mentioned more than one application depending on the mode of transport. This indicates that one application for all modes of transport could greatly add value to users’ every day mobility and would hold a strong position in the market. However, despite having many applications for different transport modes, most participants consider their current day-to-day travel experience to be neutral or satisfactory (Figure 19).

![How would you characterise your current day-to-day travel experience](image)

**Figure 19:** Participants’ rating of current day-to-day travel experience.

Regardless of the survey population’s confidence in technology use, a significant 40% has not heard of MaaS before, while out of the 60% that has heard of the concept before, 68% of them attribute it to the fact that their work is related to MaaS. This shows that the general public may not be well informed about MaaS yet and further action should be taken in order to promote the concept and allow users to familiarize themselves with it.

### 7.4.2.3 Traveller perception, criteria, needs and concerns

The second part of the online questionnaire consisted of questions that aimed to better understand what travellers value most, what criteria they consider important or not, what concerns they may have and what characteristics they would like to see on a MaaS offering. The results of these questions will greatly help in the development of the correct and user-centered MaaS product.

As part of these questions, participants were asked to evaluate which criteria they consider to be important when travelling locally and when travelling cross-border. The criteria were as follows:

- Cost
- Time
- Comfort
The majority of participants stated that when travelling locally, the most important criterion for them is reliability, followed by time (Figure 20); when travelling cross border most participants stated that the most important criterion is reliability followed by cost (Figure 21). This shows that having a reliable, well-connect and flexible network of transport options is key for all journeys, local and cross border. The least important criterion for the participants was social interaction, in both travel levels. Comfort is an important factor as well while environmental friendliness is not considered to be so much important.

**Figure 20: Most important criteria when travelling locally.**

**Figure 21: Most important criteria when travelling cross border.**
When comparing the importance participants give to each criterion in local and cross border journeys, it is shown that **cost is more important when travelling cross border, contrary to local journeys, where time and reliability are more important.**

![Comparison between importance of criteria in local and cross border journeys](chart.png)

**Figure 22: Comparison between importance of criteria in local and cross border journeys.**

Participants were given with the option to select up to 3 traveller profiles that suit them best. Based on their responses and as depicted in Figure 23, the top 3 traveller profiles are: the **daily commuter, the tourist and the businessman**. However, not far behind is the profile of the spontaneous user (16%) which suggests that the MaaS offering that will be developed should consider last minute decisions of travellers to make a route with limited or no previous planning as an important parameter in the development.
If the means of transport that are available to participants were made more efficient overall, participants state that they would be more willing to change their mobility habits and their mode of transport (Figure 24).

**Figure 23: Traveller profile as selected by online survey participants.**

**Figure 24: Willingness to change mode of transport.**

In order to develop a MaaS offering that can recommend added value services, it is necessary to evaluate what kind of information users believe would help the system recommend in an effective way travel options. According to the results of the survey and as shown in Figure 25, participants stated that the most helpful information for a MaaS one-stop-shop to be based upon would be **traveller behaviour** and **travel criteria** (cost, time, comfort). Traveller behaviour and travel criteria were also stated to be the personal information that participants would be most comfortable sharing with a MaaS one-stop-shop app, followed by their preferred language for interaction. Hobbies and interest as well as gender are information that participants were not so keen on sharing. This finding coincides with the respective workshop outcomes from stakeholders’ point of view (see section 8.3.3 below).
According to the survey population, the most crucial aspects that should be addressed in traveller’s interaction with the one-stop-shop through mobile are namely the **security of the transactions**, the **UI friendliness and intuitiveness** and the **reliability of the provided info**. Still, it is easily noticed that responses have been rather distributed across all aspects, as no aspect concentrates big percentages. (Figure 26)

As part of the survey, a number of statements were given to participants for rating, depending on whether they agree with the statement or not, on a scale of “-2” (not at all) to “+2” (very much). Their
replies (Figure 27) show that participants are reluctant to share other people’s vehicles or to share their own mode of transport. Also, they are reluctant to trust the information provided by a MaaS one-stop-shop, doubting the reliability of the information. Participants are still insecure about using an one-stop-shop mobility service and are not very confident with regard to the fact that the use of it would encourage them to change their mobility habits.

Participants were asked to state the key benefits and drawbacks of a MaaS enabling system regarding their daily and their cross-border mobility. The following tables depict the aggregated responses (of the majority). In some cases, it becomes evident that future users of MaaS may have a slight misperception of what MaaS is about in some cases. For example, the door to door journey planner as mentioned below is not necessarily a MaaS element. Also, it is clear that regardless if it is about local or cross-border journeys, there are some characteristics (of the envisioned service) that are common. Such as flexibility, independence, real time information, cost - effectiveness, friendliness to environment (as benefits), network restrictions (affecting also real time travel information update), limited or lower level information and offerings in non-central regions, concerns about reliability of information provided (as drawbacks).

Table 7: Benefits and drawbacks on a daily mobility basis.

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independence</td>
<td>Concerns about reliability of information</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Security concerns for vehicle-sharing services</td>
</tr>
<tr>
<td>Cheaper transport</td>
<td>Uncomfortable to share mode</td>
</tr>
<tr>
<td>Environmentally friendly transport</td>
<td></td>
</tr>
<tr>
<td>Efficiency</td>
<td></td>
</tr>
</tbody>
</table>
On a daily mobility basis

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Access to alternative routes very quickly and at random times (i.e. night)</td>
<td>• Limited options/restrictions for non-central regions</td>
</tr>
<tr>
<td>• Real time information on travel time</td>
<td>• Not operational in case of lack of network <em>(this was one of the key Pan-European workshop findings as well)</em></td>
</tr>
<tr>
<td>• Better use of the public transport system</td>
<td></td>
</tr>
<tr>
<td>• Door to door journey planner</td>
<td></td>
</tr>
</tbody>
</table>

Table 8: Benefits and drawbacks on a cross border travelling basis.

On a cross border travelling basis

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Time saving</td>
<td>• Concerns about reliability of information</td>
</tr>
<tr>
<td>• Cost effective journeys</td>
<td>• Not operational in case of lack of network</td>
</tr>
<tr>
<td>• Independence</td>
<td>• Worries for no real-time information update in case something changes</td>
</tr>
<tr>
<td>• Ease of use as there is no need to figure out the local transport system</td>
<td></td>
</tr>
<tr>
<td>• Flexibility</td>
<td>• Worries for non-provision of equally valuable information on different cities</td>
</tr>
<tr>
<td>• Environmentally friendly transport</td>
<td></td>
</tr>
<tr>
<td>• One app for all is convenient</td>
<td></td>
</tr>
<tr>
<td>• Real time information on travel time</td>
<td></td>
</tr>
</tbody>
</table>

Finally, when sharing last thoughts about MaaS, participants raised the concern of data privacy and tracking of their routes, cost of subscription to the service as well as security and interoperability from one country to the other.

7.5 Key aggregated results

The key findings regarding current traveller behaviour and their needs, preferences and priorities from all the different sources (literature survey, focus groups, on-line survey,) are summarised/aggregated below.

- Most travellers are willing and/or very willing to change their mobility habits and their mode of transport provided travel services are made better overall, and provided that data privacy and security of information are ensured. Travellers need to be assured that the application will use their personal information only to suggest tailor made solutions and for no other reasons.
- When travelling locally and especially cross border, travellers stated that reliability of information and interoperability are the most crucial criteria as participants expressed that they did not want to miss out on options and offers in case all transport information is not aggregated into the MaaS app.
- Vehicle-sharing in general is a notion that raises several concerns by specific traveller clusters.
- Security of transactions and user friendliness/intuitiveness are the two most crucial aspects that should be addressed in traveller’s interaction with the one-stop-shop through mobile.
- Travellers would like to enjoy traffic management services as this would help them in their decision making regarding which mode of transport to use and which route to follow.
- Social inclusion was an important aspect for travellers when discussing about MaaS.
8 Other stakeholders needs, expectations & priorities

8.1 Introduction

MaaS ecosystem does not only encompass the travellers but also a series of other stakeholders, as discussed in section 4. The needs and priorities from their perspective but also the expectations from them in the overall MaaS context have been investigated on the basis of literature sources and throughout the Pan-European workshop that was held in the context of MyCorridor project.

8.2 Literature survey results

8.2.1 Government & Public Authorities

The roles of policy and regulation are important as they can shape how MaaS meets the needs of society. Government plays an integral role in transport management as it involves policy formulation (local transport policy/strategy), setting transport rules and regulations, transport service delivery through in-house or contracted services (public transport, public bike schemes, travel information), as well as operational aspects (traffic management) [64].

Authorities and policy makers should answer many questions regarding MaaS, in order for the ecosystem to be built effectively and contribute to society, rather than just ending-up another commercial product. More specifically, they need to [79]:

- Determine their role in the MaaS ecosystem: enabler, influencer, partner.
- Decide which business and operational model is more appropriate.
- Determine the strategic and economic business case for MaaS.
- Decide what policy incentives, constraints and disincentives exist and how to adapt them to the MaaS ecosystem.
- Ensure policy remains responsive and enabling.
- Examine the framework based on which public and commercial organisations can work together to effectively deliver MaaS.
- Explore how payments and public transport ticketing can operate across mobility platforms.
- Explore how devices, providers and services can be interoperable.
- Determine how pricing can be best aligned so as MaaS is cost-efficient for all participating actors.
- Formulate legislations and service agreements to ensure data collection can be transparent while giving users control of their privacy and security.
- Determine the policies under which data should move between ecosystems.
- Leverage the best of the private transport sector, include them in the public transport offering, and incentivise people to use alternatives to car ownership [82].

As a priority, a number of KPIs should be set by public authorities and governments in order to examine and evaluate the contribution of MaaS in the environment, energy, mode share, and social inclusion...
before determining how they will support MaaS implementation [59]. Moreover, it is imperative for public authorities to influence MaaS providers in such a way so as to ensure MaaS’s social contribution to the transport system and society and prevent it from being solely commercial [59]. This means that authorities should clearly define what the best role in the MaaS ecosystem is for them – enabler, leader or bystander. It is also necessary to find the right public-private sector balance for transport service planning/booking/payment [64].

Transport authorities generally support working in partnership with the private sector to develop better outcomes for customers, especially for journeys (low demand) and population groups (elderly and disabled) that cannot be easily accommodated by traditional public transport. According to Polis members [64], the overriding public policy priority is to reduce the environmental impact of transport, increase safety, while keeping people moving and supporting economic growth.

Further to that, and upon determining the necessary KPIs, public authorities need to set the appropriate framework, develop the right policies and give incentives for MaaS to grow according to that framework. To motivate participants from various sides to take part in this new ecosystem, public authorities need to smartly allocate funding and resources and ensure adequate transport infrastructure is available.

Last but not least, the legislative framework that public authorities must create should take into consideration the negative, if any, impacts of MaaS and look into solutions to mitigate them through policies, legislations, campaigns etc. [59].

UK’s Catapult Transport Systems has conducted several stakeholder workshops and has revealed the following indicative policy areas that are affecting how MaaS is/should be delivered [6Error! Reference source not found.].

![Figure 28: Policy And Regulation Areas affecting how Maas is delivered.](image)

### 8.2.2 MaaS operators/aggregators
MaaS Operators are the actors that will bring together all mobility and associated services and provide them to the travellers. The MaaS operator is responsible for combining the existing transport services into a single mobile application following the “one-stop-shop” principle. Also, the MaaS operator is responsible for providing as much as possible personalised transport plans (tailored to customer needs) and for customer service and user experience [23]. To achieve the above, the MaaS operator must determine the collaboration framework with the transport service providers and the mobile service providers, ensuring, at the same time, it abides by the legislation, as provided by the policy makers. More specifically, MaaS operators are expected to:

- Receive schedules, fares, real-time information, modifications, cancelations, etc. from transport providers under the formulated legislation about data exchange, data sharing and data security [12].
- Make transparent, viable and beneficial Service Level Agreements (SLAs) with all transport providers (public transport, vehicle sharing, taxis, bikes, etc.).
- Make an Application Programming Interface (API) that allows 3rd parties (transport service providers) input their content [46].
- Develop user-friendly feed APIs to allow individual operators to join MaaS simply and easily [58].
- Act potentially as the core of the novel business model(s) introduced, with mobile services and ICT being the cornerstone of their success [3].
- Receive all key enabling technology and services needed (mobile ticketing and payment, etc.) from the mobile service providers [12], accompanied with the appropriate licensing, training, resources, etc.
- Make appropriate contract to ensure technology availability, technical support, system reliability, interoperability and security, according to policy guidelines and according to ICT standards.
- Provide a user-friendly, intuitive, reliable and adapted to different user profiles interface to travellers.
- Determine their revenue model and offer competitive packages to customers, upon agreement with the participating service providers, complying at the same time with all relevant legislation concerning user privacy, data exchange and security [46].
- Ensure that all transactions with both customers and service providers are abiding interoperability and security rules.
- Adopt cost efficient rewarding mechanisms with positive impact to environment and society to attract more customers.

8.2.3 Transport Service Providers

Transport service providers are key participants in the MaaS ecosystems as they provide the transport assets and services, such as public and private infrastructure, highway capacity and urban assets such as car parking, charging stations, ITS infrastructure [78]. Their participation in MaaS is crucial and transport providers need to fulfil a number of requirements in order to allow the provision of effective MaaS services. In more specific, they are anticipated to:

- Make transparent, viable and beneficial SLAs with all mobile service providers to ensure legally compliant and secure data exchange.
- Open their data to third parties.
- Share schedules, fares, real-time information (modifications, cancelations, etc.) with MaaS aggregators (if they are not acting themselves as such), to allow overall reliable and high-level service provision. Information sharing must be conducted according to the formulated legislation about data exchange, data sharing and data security [12].
- Accept and allow the booking and selling of transport fares through online platforms that will be run by the MaaS operators.
- Ensure the necessary (transport) infrastructure to support MaaS is available and make any additional interventions to allow it (i.e. organise resource allocation throughout the day according to mobility habits, peak hours, etc.).
- Examine pricing policy under the new conditions and make competitive ticket offers.
- Allow various and compliant forms of e-ticketing and e-payment.

8.2.4 Mobile (Infomobility, added value, technology) Service Providers

Mobile service providers are providing key enabling ICT and other technology, such as mobile ticketing and payment as well as data and infomobility services to the MaaS operator and to transport services providers. Their role is integral in order to facilitate MaaS growth and they have the opportunity to establish themselves in the market.

Among other, mobile service providers need to build the network infrastructure that enables communications between vehicles and physical infrastructure components, such as bus stops, bike-sharing stations, roadways etc. [32]. Further to that, telecom companies need to develop an open, integrated platform that will work across different types of devices and vehicles to support a variety of content formats. It is essential to ensure interoperability and security of data across platforms as well as ensure they have the appropriately skilled people to support it. Moreover, as data traffic increases, mobile service providers need to develop the higher-bandwidth 5G network to support future traffic and be able to provide high reliability and strong data security [32].

Therefore, direct actions that mobile service providers need to take are summarised below:

- Build network infrastructure to enable V2I communication.
- Develop an open, integrated platform to operate over various devices and vehicles.
- Ensure interoperability and security of data, according to industry standards and legislation.
- Develop high bandwidth 5G network to support the constantly increasing data flow.
- Make the appropriate agreements with the MaaS participants, more specifically with the MaaS operator who will use their technology infrastructure to provide MaaS services.
- Ensure maintenance of the technological platform according to MaaS growth and user needs.

As a further step, mobile service providers can use their database of subscribers and billing centres to collaborate with third parties in order to provide added valued services to lure new customers and keep the existing ones from changing to competitive operators.

8.3 Pan-European workshop results

8.3.1 Introduction

The 1st Pan-European workshop of MyCorridor took place on the 9th of February 2018 in London, UK and was hosted by Osborne Clarke. The programme of the event was communicated in advance to the partners invited together with registration (https://www.eventbrite.co.uk/e/mycorridor-workshop-mobility-as-a-service-across-borders-tickets-41072956318). All presentations made during the workshop are available at the MyCorridor web site project library (http://mycorridor.eu/project-library/). More than 50 stakeholders attended.

The scope of the event was to make the first public presentation of MyCorridor project, to discuss the challenges of implementing MaaS from the legal, governmental and research perspectives overall, and,
finally, to get insights by the experts participating through an interactive session that concluded the project in specific project aspects with the aim to take them on-board in the respective activities following (use cases and requirements, design and business models, etc.). As such, a series of key-note speeches was included followed by the project presentation, before the interactive session realisation.

Upon the completion of the event, posts followed in the web site (http://mycorridor.eu/2018/02/first-london-workshop-identifies-trust-as-key-to-maas-success/) and the social media of the project, where one can follow the schedule and key outcomes of the workshop.

The most interesting findings of the open discussion that was conducted during the workshop are as follows:

- As Christopher Irwin, Member of the European Passengers’ Federation (EPF) Council (key-note speaker in the workshop) stated: “There are three interesting aspects in MyCorridor. Firstly, its educational quality: it will teach people what Mobility as a Service (Maas) is all about. Then, there is its experimental side: it will test the concept through pilots. Thirdly, it will bring together practitioners in different areas to create synergies that are necessary to create something useful for MaaS across the European continent.”

- On the other hand, Ivo Cré, Deputy Director at POLIS Network (another key-note speaker in the workshop) who looked at the role of local governments in developing MaaS, concluded that the involvement of local authorities is still very limited, whereas he noted risks in developing a purely commercial approach to MaaS.

- Trustworthiness of the offered MaaS service seems to be the key to MaaS success in all aspects. This finding is in line with the outcomes of the focus groups with travellers (section 7.3).

- On the other hand, dependence on ICT (i.e. network availability, mobile phones, etc.) seems to be the key restriction.

The interactive session towards the end of the workshop was conducted to survey the participants on their views regarding needs and priorities, policy, market and other issues relevant to the project’s success. The set of unique audience insights from the session were shared afterwards with the workshop participants and the members of the MyCorridor Interest Group.

In addition, after the workshop, an online questionnaire was communicated to the participating stakeholders to obtain further and more elaborate feedback from the experts on specific project aspects.

The aggregated results of both the interaction session and post-workshop on-line surveys are summarised and discussed below.

8.3.2 Interactive workshop survey results

The interactive session, managed through Mentimeter tool (https://www.mentimeter.com/) addressed four key topics, namely MaaS & public sector, MyCorridor Use Cases, Business Models and Towards a Euro-Mobility ticket. The guiding presentation (moderated by CERTH/HIT) is provided in Annex 3 of the current document for reference.

As shown in Figure 29, participants strongly indicated that transport authorities should be particularly involved in road traffic management, travel information services (for all modes) and in the integration of platforms for planning, booking and paying for a trip, in opposition to car-sharing, ride-hailing services and, even, bike sharing.
Further to that, the majority of respondents believe that transport authorities can best support MaaS through regulation and contracts or agreements and financial incentives/disincentives (Figure 30) while they replied that MaaS success should be rather market driven (Figure 31). The last answer is rather justified from the fact that most of the participants were originated from the commercial world rather than the public authorities' one.

Figure 29: "How involved should transport authorities be in each case".

Figure 30: "How can transport authorities best support MaaS".
After a short introduction on the MyCorridor anticipated Use Cases and the targeted user profiles categories by the project - as a primary personalisation layer for the one-stop-shop that will be implemented and the type of travellers that will be sought during the project pilots - participants were asked to evaluate the most important profiles that the project should focus on. As depicted in Figure 32, stakeholders selected as priority profiles the **daily commuter, the tourist and the spontaneous user profile**. This mainly agrees with Figure 23 which depicts the main profiles travellers would wish configuration upon (though, interestingly enough, stakeholders suggest the spontaneous user vs the businessman selected by the travellers). Still, in the context of the free discussion that followed, it was stressed that travellers should be able to easily shift from one profile to another or to further customise the default options provided by the system.

In order for MyCorridor to provide as much as possible personalised solutions, it is essential to have access to some minimum personal data of the travellers; though anonymised. Stakeholders determined **travel behaviour, mobility or other type of restrictions** and **payment method** as the most crucial information for optimum MaaS product delivery (Figure 33). Strangely, gender, age and language preference were seen as the least important (as also emerged through the on-line survey with the travellers). “Other” in this case corresponds to language settings (one participant stated that it should be clearly language setting and not nationality that is asked from the traveller) and key travel criteria (cost, time, ...) that makes most sense for each traveller as stated by another participant (as explained by the moderator, this last item is indeed considered in another loop that followed in a coming question – see Figure 35 respectively).
In a follow-up question that asked which of those personal information, they would be willing to share without a concern, the stakeholders stated that it would definitely be their travel behaviour, which includes preferred transport modes, favourite POIs, and transport schedules, but also pretty much all other items as well, apart from personal hobbies where willingness is much lower (Figure 34). This may come into contradiction with the replies received from focus group participants as they seemed more reluctant to share their behaviour, schedules and places with MaaS (still agrees with the outcomes of on-line survey with the travellers).

Stakeholders were asked to rate the importance of the characteristics that should be used by the MaaS operator to configure the services that will be offered to travellers. Similarly to focus group participants and traveller online survey respondents (7.4), they rated time and cost as the most important input “filtering” criteria for MaaS offerings, and, on secondary basis, comfort and friendliness to environment (Figure 35).
Figure 35: "Importance of characteristics when selecting MaaS".

The most important incentives for service providers to join MaaS platform according to stakeholders are the increase in revenues (Figure 36). However, all other incentives were also rated as important, with ease to join and security & data protection for own users being the two most important of them.

After a short introduction on business models aspects, as perceived by MyCorridor, and an explanation of TM2.0 for non-familiar participants, the stakeholders were asked to answer some relevant questions as seen in Figure 37. As an outcome, they stated that integrating interactive traffic management (TM2.0) is expected to have significant impact on the success of MaaS and that multi modal traffic management is almost vastly impacted by MaaS deployment.
An important concept that was introduced and discussed in the workshop was the Euro Mobility ticket (as perceived by MyCorridor). As shown in Figure 38, the majority of stakeholders find the Euro Mobility ticket of necessity and that the main barrier towards its adoption is rather of regulatory nature, followed by technical restrictions (Figure 39).

Figure 37: “Impacts related to TM2.0 and multimodal traffic management”.

Figure 38: “Necessity of the Euro Mobility ticket”.

Figure 39: “Barriers towards the adoption of a Euro Mobility ticket”.

An important concept that was introduced and discussed in the workshop was the Euro Mobility ticket (as perceived by MyCorridor). As shown in Figure 38, the majority of stakeholders find the Euro Mobility ticket of necessity and that the main barrier towards its adoption is rather of regulatory nature, followed by technical restrictions (Figure 39).
8.3.3 Post feedback survey results

About 20 participants completed the post-workshop on-line survey. As depicted in Figure 40, Figure 41 and Figure 42, the majority of respondents belong to the age group 35 – 44, are male and come from Greece (40%), the Czech Republic (20%), Ireland (20%) while a 20% did not disclose any information about their country. As it can be seen in the survey form (Annex 4), in order to comply with the personal data protection guidelines, apart from full anonymisation, some of the personal data were optional to give (in order to avoid the risk of retrieving ID associations).

![Sample Age Distribution](image)

Figure 40: Age distribution of sample population.

![Gender distribution](image)

Figure 41: Gender distribution of post feedback survey participants.

![Where do participants come from?](image)

Figure 42: Country distribution of post feedback survey participants.

Within the survey, participants were asked to state their expertise. Figure 43 depicts the various expert backgrounds.
As can be seen in Annex 4 of the current document, the post-feedback on-line survey targeted audience was the workshop participants and addressed 4 main topics, namely MaaS enablers and barriers, Business Models and MyCorridor Use Cases. At the end, questions regarding the workshop quality itself were posed. The feedback provided for the MaaS enablers and barriers has been consolidated and presented in the relevant section (section 9.3). The aggregated results on all the other parts are summarised and discussed below.

The feedback was received and analysed following the same approach that was used for the interactive session of the Pan-European workshop (i.e. using the rating scale [-2, +2] and analysis upon weighted average).

**Business Models related results**

Experts were asked to prioritise the following promotion strategies according to their importance in stimulating MaaS business success.

- Loyalty schemes
- Promotion campaigns
- Scaling discounts
- Added value services
- Tax reductions
- Calculating CO₂ reductions by eco-driving
- Comparing environmental benefits because of modal shifts
- Other

Participants ranked the above mentioned strategies as depicted in Figure 44. In order to process their responses, the ranking was evaluated against a gravity factor ranging from 1 (least important) to 9 (most important). The first option corresponds to a gravity factor of 9 while the last option corresponds to a gravity factor of 1.

According to their responses, the top three strategies they consider to be more important for stimulating MaaS business success are namely scaling discounts, promotion campaigns and loyalty schemes.
Further to that, participants were asked to prioritise the socially responsible traveller strategies according to their importance in influencing travellers’ behaviour towards environmentally friendly mobility choices. Again, in order to process their responses, the ranking was evaluated against a gravity factor ranging from 1 (least important) to 8 (most important). The first option corresponds to a gravity factor of 8 while the last option corresponds to a gravity factor of 1.

Figure 45 shows that the top three strategies for encouraging more environmentally friendly mobility habits are scaling discounts, comparing environmental benefits because of modal shifts and tax reductions.
Use Cases related results

As far as Use Cases are concerned (reflecting in reality the anticipated functions of the one-stop-shop to be developed), experts were asked to rate each planned function of MyCorridor one-stop-shop as Essential or Secondary. The following table summarises their replies, whereas these replies have been taken into consideration for the final prioritisation of Use Cases (see section 12 of this document). It seems that whichever Use Case/function is related to personalisation (“Profile set-up”, “Personalised info support”) is rated as secondary (according to stakeholders) together with rewarding mechanisms and traveller feedback. From the MaaS operator point of view, on the other hand, only matchmaking and back-offices synergies are seen important. Payment is required to operate clearly in along all dimensions, whereas for the participating service providers, log-in and registration are the essential functions from the workshop stakeholders’ point of view. Overall and strangely enough, it seems that the business models aspects, from whichever perspective (the operator, service provider) are not seen as priority functions for a MaaS one-stop-shop. Still, they are core mechanisms that have to be clearly conceptualised and implemented to ensure a smooth operation of a commercial system.

Table 9: Rating of each planned function/use case of MyCorridor one-stop-shop.

<table>
<thead>
<tr>
<th>Plannned Function/Use Case</th>
<th>Essential</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>From the traveller’s interaction point of view</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User login/Register/Authentication</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Profile set-up</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Personalised MaaS product selection and booking</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Personalised info support</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MaaS product payment and vouchers issue</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Redemption (use/validation)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Change/Cancelation</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Traveller feedback</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Loyalty scheme/Rewarding</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>From the MaaS Issuer/Aggregator/Operator’s interaction point of view</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matchmaking for MaaS product delivery</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Overall Business Rules editing</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Provided services performance ranking</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Synthesis of added value services</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Multi-criteria search functionality</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Back office synergies with participating services providers - Euro mobility ticket</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>From the Payment Facility’s interaction point of view</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-money voucher to the traveller</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Clearance-vouchers issue and distribution</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Clearance - vouchers redemption</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>From the participating Service Provider’s interaction point of view</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service provider log in</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Service registration</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
Finally, participants selected the most crucial aspects that should be addressed in the traveller’s interaction with the one-stop-shop. The results are depicted in the figure below and it seems the views are shared. **Significant number of options available** is the most popular outcome.

**Figure 46: Most crucial aspects in travellers’ interaction.**

### 8.3.4 Overall workshop outcome, key conclusions and follow-up actions

Upon the completion of the questionnaire, participants were asked to evaluate the workshop overall. In conclusion, the workshop was considered to be useful and participants believe the MyCorridor project is on the right path towards achieving its goals and towards contributing to MaaS vision.
Combining the insights and the information collected throughout the workshop and through the post feedback form, the following key points can be summarised as far as stakeholders are concerned:

- Transport authorities can play a major role in MaaS success through regulatory actions.
- Scaling discounts, loyalty schemes and tax reductions are considered to be the most important promotional strategies for MaaS success.
- Transport authorities should be involved in road traffic management and travel information services for all modes.
- The main traveller profiles that MyCorridor should focus on are the daily commuter and the traveller.
- Stakeholders agree with travellers that time and cost are the two most important characteristics for MaaS configured services.
- Following increase in revenues, security of data is the next most important incentive for service providers to participate in MaaS.

During the workshop, all stakeholders participating – a lot of them being transport and service providers themselves – showed high interest in joining MyCorridor one-stop-shop. As they were acknowledged by the Consortium, they will be all kept in the loop and will be invited in future dedicated workshops and focus groups that will follow in near future (within 2018) and will aim to address specific technical and business aspects of the system upon presentation of mock-ups and functional prototypes progressively.
9 Key success and failure factors for MaaS deployment

9.1 Introduction

MaaS represents a revolutionary concept that offers consumers access to a range of mobility (and mobility related) services and journey experiences by interfacing a unique platform (one-stop-shop) and utilising the new-born concept of the “mobility package”. MaaS may be perceived by travellers as a ‘better choice’ and may change how we currently travel. In the future, the private car may not be perceived as such a popular choice for getting from A to B, or maybe even the private car usage could be included in the MaaS experience in combined scenarios. Nevertheless, there is uncertainty as to how the MaaS marketplace will develop, as MaaS offerings may take many forms and be marketed to different types of customers.

MyCorridor solution may hugely support the MaaS concept by providing distinct features across the whole EU and addressing citizens’ concerns. This will be achieved through the innovative platform and novel business schemes that MyCorridor will propose. MyCorridor will enable a paradigm shift specifically for car users, by driving the “vehicle world” towards MaaS. One of the reference points of the MyCorridor project is the TM2.0 platform, and therefore, the starting point are those mobility services related to the interactive traffic management vision of the “vehicle world”. It aims to extend the current capability of TM2.0 by integrating pan-European data sets in a single platform, able to offer urban and interurban services that are multimodal, seamless, flexible, reliable, user-friendly, all-inclusive, cost-effective and environmentally sustainable.

In this section, key success and failure factors for MaaS deployment are analysed across 6 key clusters: User-market related, Conceptual, Technological, Organisational, Business-related and Legal. Furthermore, it is identified which are the involved stakeholders in each case.

9.2 Methodological approach

The methodological approach used consists of the following consecutive steps:

1. Definition of barriers and enablers: the study started with the definition of barriers and enablers by clearly defining the concepts of barriers and enablers.

2. Identification of relevant categories of barriers and enablers: the barriers and enablers were clustered in the following categories, namely:
   - Human-related
   - Conceptual
   - Technological
   - Organisational
   - Business-related
   - Legal

   Starting from the categories identified in the project DoA, the categories have been determined upon the feedback from project partners and the bibliography study (basically from TM2.0 initiative in this case).

3. Identification of the barriers and enablers per category: the main barriers and enablers for each category have been identified and discussed. For this purpose, a thorough bibliography analysis was performed on MaaS concept and the MyCorridor beneficiaries have provided feedback upon a respective spreadsheet provided. Furthermore, the study results have been
consolidated with the respective feedback provided by the experts that participated in the 1st MyCorridor workshop (barriers & enablers section of Annex 4).

4. **Identification of stakeholders’ roles/responsibility in barriers and enablers**: this emerged as of the literature survey and, again, the internal and external experts’ feedback.

Further details are provided below for each of the methods used, whereas the outcomes of each step of the methodological process described above are provided respectively in the following sections.

- **Input from strategic priorities, policies & current market**
  The review of the relevant emerging MaaS schemes (section 6) and the strategic priorities and policies (section 5) has assisted with the primary recognition of enablers and barriers for MaaS implementation and penetration.

- **Literature review**
  An extensive literature review has been carried out to systematically assess the existent evidence on barriers and enablers. Relevant studies have been identified by searching relevant databases, targeted MaaS websites (e.g. MaaS alliance), policy documents, academic literature, research articles and publications (i.e. from ITS conferences, etc.).

- **MyCorridor beneficiaries/stakeholders**
  Feedback for both the recognition of enablers and barriers and the involvement of stakeholders per each has been collected initially by MyCorridor beneficiaries through internal survey.

- **External experts’ feedback**
  Corresponding feedback was collected from the experts that participated in the 1st Pan-European workshop of the project through the on-line feedback form that was sent following the workshop (Annex 4 – Section: MaaS enablers and barriers).

### 9.3 Barriers & Enablers

#### 9.3.1 Definition of barriers and enablers

**Barriers** are defined as any factor deterring, complicating and prohibiting the implementation, performance or wide penetration of MaaS services. On the contrary, any factor that supports them can be identified as an **enabler**. Moreover, as enablers the trends that are expected to boost the development of such services are denoted, while barriers are the issues that need to be carefully tackled in order to facilitate these developments [1].

It is clear that both enablers and barriers may operate in several layers. For example, a lack of funding hampers the implementation of a service, while issues with interoperability of ITS services may hinder its actual performance. Given the overall MyCorridor objectives (exploration the opportunity of large scale deployment for MaaS, with a focus on the future role of transport policy, by analysing the related concept-reality gap), this study paid particular attention on barriers and enablers affecting the implementation of MaaS services on a large scale on different type of routes from local (urban/interurban) to cross-border level.

#### 9.3.2 Categorization of barriers and enablers

To structure the barriers and enablers for the deployment of MaaS services, **six** broad categories are defined based on the MyCorridor project DoA and the consolidation of the results obtained in this study as analysis of the literature review [1] and the results obtained by the interviews performed among MyCorridor project partners.
The identified enablers and barriers in the TM2.0 have focused on five areas: Conceptual, Technological, Organizational, Business-related and Legal. From the interviews carried out among MyCorridor partners and through MyCorridor’s vision, the need to include a category related to the User and Market related aspects, with the aim to better understand social and cultural issues which are considered relevant for the MaaS services implementation. It is worth noting that these categories are applicable to both barriers and enablers since each identified category can be equally interpreted as barriers (lack, limitation, low) or enabler (presence, high level, improvement).

A short description per cluster is presented below:

- **User and market-related enablers & barriers**
  Refer to human attitude and response to changes, how changes are introduced and how this is reflected in the market.

- **Conceptual enablers & barriers**
  Refer to the adoption and deployment of new concepts.

- **Technological enablers & barriers**
  Refer to infrastructure features, availability of tools and technologies.

- **Organisational enablers & barriers**
  Refer to aspects on overall interaction among the different entities having common goals and linked to external environment.

- **Business enablers & barriers**
  Refer to the business impact and model.

- **Legal enablers & barriers**
  Refer to issues and drivers related to legal and regulation requirements.

### 9.3.3 Overview of barriers and enablers

The overview of the relevant barriers and enablers recognised for the deployment of MaaS services is provided in the following table. **21** general barriers and **18** general enablers have been identified.

<table>
<thead>
<tr>
<th>Category</th>
<th>Barriers</th>
<th>Enablers</th>
</tr>
</thead>
</table>
| User and market-related | • Limited understanding of user needs  
                          | • Lack of user acceptance                                               | • Higher level of end user’s involvement  
                           |                                                                          | • Increased attention for sustainable transport  
                           |                                                                          | • MaaS potential to offer flexible and personalized services  
                           |                                                                          | • Trends supporting MaaS Growth |
| Conceptual            | • Ambiguous reliability of exchange data  
                          | • Limited political acceptance and intervention  
                          | • New roles for public                                                  | • TM2.0 concept |

Table 10: Overview of barriers and enablers for the deployment of the MaaS services.
<table>
<thead>
<tr>
<th>Category</th>
<th>Barriers</th>
<th>Enablers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>administrations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• New business model acceptance</td>
<td></td>
</tr>
<tr>
<td>Technological</td>
<td>• Unaddressed interoperability and compatibility</td>
<td>• High penetration of Navigation Devices</td>
</tr>
<tr>
<td></td>
<td>• Unaddressed security and data management</td>
<td>• Increase in penetration of reliable traffic information</td>
</tr>
<tr>
<td></td>
<td>• Need for a (currently missing) mechanism for open location data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Need for (currently missing) correct mobile network dimensioning</td>
<td></td>
</tr>
<tr>
<td>Organizational</td>
<td>• Lack of cooperation between stakeholders</td>
<td>• Establishment of MaaS alliance</td>
</tr>
<tr>
<td></td>
<td>• Ambiguous availability of skilled staff</td>
<td>• Universal mobility offers</td>
</tr>
<tr>
<td></td>
<td>• Lack of security infrastructure for cooperative vehicle data</td>
<td>• Progress of cooperative ITS data policy in Europe</td>
</tr>
<tr>
<td></td>
<td>• Need for (currently missing) common data formats for intermodal traffic information</td>
<td>• Stronger cooperation between stakeholders</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Smart Ticketing Alliance (STA)</td>
</tr>
<tr>
<td>Business-related</td>
<td>• No clear business model</td>
<td>• Political pressure for change</td>
</tr>
<tr>
<td></td>
<td>• Users’ privacy concerns</td>
<td>• Public-Private Partnerships</td>
</tr>
<tr>
<td>Legal</td>
<td>• Allocation of liability</td>
<td>• Crypto-currency assets</td>
</tr>
<tr>
<td></td>
<td>• Unspecified ownership of data</td>
<td>• Geo-blocking Regulation</td>
</tr>
<tr>
<td></td>
<td>• Data protection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Financial services laws and regulations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Competition regulations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Unsupportive regulation and legal framework</td>
<td></td>
</tr>
</tbody>
</table>

9.3.3.1 **User and market-related enablers & barriers**

This category is related to human attitude to changes, how changes are introduced and how this is reflected in the market. It includes barriers/enablers related to user acceptance, limited understanding of the user needs and of the use of the services, increased attention for sustainable transport and for a provision of services being more and more flexible and personalised. Finally, the current trend towards increased densification of city centres creates incentives for citizens to consider alternatives to own their own car.

In detail, the **main barriers** identified are the following:

1) **Limited understanding of user needs**

The understanding of user needs may not be perceived as a barrier per se, but can have significant influence either as barrier or an enabler depending on the solution meeting them or not.
On the one hand, the lack of targeted user needs analyses may lead to solutions that will lack user acceptance. On the other hand, an adequate user assessment is expected to bring about enthusiastic acceptance and adoption. To address this barrier, attention should be paid to have an accurate market understanding and own vision and adopt a user-centred approach in design, development and testing phases, before commercialisation.

2) Lack of user acceptance

Acceptance of the MaaS services by its users is vital, as these innovative services can only be effectively implemented when users are willing to buy/use them. In general, consumers have difficulty accepting unproved technologies, afraid of the inherent and unrecognised risks associate to them, and tend to rely on familiar technologies they have used in the past [68]. Users care about safety, privacy, reliability, and are aware of the usefulness and simplicity for technology use, its availability and quality. Internal factors that depend on personal characteristics and personal decisions, are related to one’s needs and priorities [65].

Lack of knowledge on newly introduced technologies, services and, consequently, on their use, may also hinder acceptance by users. For example, when MaaS offers are provided via an application, it must be taken care that persons, who are not accustomed to using digital services, are not excluded from using the offers.

User acceptance is influenced by cultural factors (values, norms, beliefs, customs and traditions) as well. Finally, the user ability to pay for MaaS services also plays a role in the user acceptance, so, the market uptake must strongly consider the pricing policy that will be able to offer the best value for money.

In this context, a study has been performed by UbiGo, aiming to investigate the travellers’ motives for adopting a new, innovative travel service [72].

This study emphasises the obstacles associated with changing travel behaviour and habits, in particular a shift from private car to other modes of transport. Results of the UbiGo study suggest that giving up one’s private vehicle is not the main barrier, as would be expected; rather, the main barrier is for users to accept not having a readily available car whenever the user needs it.

By a more mode neutral approach and by offering a service that includes also access to a car, the environmental impact of a broker service such as UbiGo could still have positive effects in terms of reduced use of the car and, when so, as a shared resource.

If the carsharing/rental cars are further non-fossil-fuelled, the impact could be even more positive.

A change in mobility behaviour will however not come about only as a consequence of such an offer. The initial analysis of the results reveals that it is vital to generate interest and excitement about new transportation schemes.

In general, individuals who have high social status and more advanced education are well-informed, and, in the case of innovations adoption, are also more willing to take risks. The UbiGo results also support the notion that the innovation (here in terms of a practice) must offer some relative advantage to be adopted, i.e. the service must appeal to the users on a practical level and facilitate their daily travel. When it has not been curiosity motivating people, it has been convenience and economy, and it is these practicalities that will keep the users, including the most open-minded ones, motivated to continue using the service after the novelty and curiosity fade.
Last but not least, the personalisation layer aiming to meet user needs, demands and preferences leading to tailor made products may prove to be a key enabler in user acceptance.

While, the main enablers are:

1) **Higher level of end users involvement**

As already explained above, the users’ involvement in all phases of a novel solution is vital to its acceptability.

2) **Increased attention for sustainable transport**

The transport sector has been constantly confronted with different sets of challenges in its transition to a more efficient and sustainable transportation system. Most notable are safety, traffic congestion and the increasing levels of greenhouse gas emissions that result from the rapidly changing demographics and urbanisation (European Commission, 2011). These are considered problems of paramount concern. As a consequence, various stakeholders in the public and private sectors have stepped up to tackle these challenges. The key stakeholders begin to recognise the benefit of MaaS services on, the better the quality of life of the citizens and the environment. Sustainability goals are shared among the different actors and tied directly to MaaS. By providing an easier access to personal transport services (e.g. car-sharing, taxis, bike-sharing), the need to use own car would be reduced. Therefore, users may be more inclined to use public transport and multimodal solutions and MaaS is an opportunity to promote more sustainable travel.

3) **MaaS potential to offer flexible and personalised services**

The definition of MaaS encapsulates the ability for the service to offer any type of travel experience using any form of transport service, public or private. Market conditions shape the MaaS offerings made available on the market and it is expected that innovation in MaaS will result in consumers having a wide range of mobility services. Moreover, using one central digital mobility platform/app to interface the different data sources and manage the provision of a unified mobility service, it creates the prerequisites to satisfy often complex individual needs with regard to the overall service/product provided [6].

Finally, we highlight as success factor for MaaS deployment the "Extent of application" in term of modes covered, topics/information covered (location, price, quality, etc.) and territory covered as reported by Mr. Christopher Irwin, from European Passengers’ Federation, during the 1st MyCorridor workshop [49].

4) **Trends supporting MaaS growth**

The CATAPULT project [6] reports how trends support the MaaS growth. There are several trends that may support MaaS deployment, which can be summarised into three main themes:

A. **Consumer expectations**: consumers are increasingly expecting their experiences in transport and other sectors to be delivered as a “service” and are looking to get more value as a result. In particular, the following issues can be underlined:

   I. **Better interchange is expected by consumers**: There is an increasing focus on the whole journey experience and for better interchange for travellers.

   II. **Demand for the sharing economy is growing**: the carsharing market is predicted to have a compound annual growth rate of 23% between 2013 and 2025.

   III. **Demand for the “as a service” Economy is growing**: the growth of service-based platforms in other sectors has been strong in recent years, with industry analysts predicting further
growth. Notable example include Spotify, Netflix and Amazon Prime. As mentioned again in the current document, the fact that many cars are parked for over 90% of the time may provide an opportunity for the “as a service” model to offer consumers better value than offered by the car ownership model.

B. Technology change: the opening up of transport datasets has already added significant value to travellers in terms of new applications (e.g. news e-hailing application for smartphones/tables/PC). As a result of the Internet of Things (IoT), transport data will become more pervasive. Combining big data with new autonomous transport systems will enable opportunities to innovate and refine MaaS offering. Multimodal apps allow the user to compare different transport modes, e.g. flight vs trains vs long-distance buses. More and more apps also allow mixed-modal trips. In detail:

I. Information Ubiquity: the availability of transport data as “open data” has already delivered significant value, estimated at £58 million in London alone. IoT may accelerate the growth of the data pool that can be exploited by MaaS.

II. Automation: Autonomous vehicles are expected to become increasingly common. Such vehicles could be integrated into MaaS and offered to customers as a service.

III. Appetite of Early Adopters: Driven by a desire to be first to market and facilitated by enhanced connectivity and lower barriers to access, platform developers are offering their products to market at beta and pre-beta stages. This is fuelling early adoption of new services by specific customer segments and this can support the fast growth of new MaaS value propositions.

C. Changes in mobility consumption: younger people, who are the most likely to adopt new mobility models, are increasing deciding to not own cars. Economic crisis has assisted in that direction. Transport authorities are looking into new technology platforms to help them manage the use of their assets. Citizens are becoming willing to pay in advance. Changes in mobility consumptions are associated with the:

I. Demand for car ownership: Whilst vehicle ownership is still dominant, attitudes to car ownership are shifting. In the UK, this is particularly pronounced amongst younger people, where the percentage of under 20s owning a driving license has decreased by 40% since 1995.

II. Congestion Crunch: 323.7 billion miles were driven on Great Britain’s roads in 2016, a 2.2% increase from the previous year and 6.5% increase from 2011 (Statistical release, 27 April 2017, department for Transport, Road Traffic Estimates: Great Britain 2016). Population growth may exacerbate congestion in the future.

III. Urbanisation: An increasing proportion of the global population is living in the urban areas – currently estimated at 53% of the global population.

D. Market readiness: As summarised in section 6, MaaS offerings are more and more penetrating in the market and are contributing to the market readiness to adopt MaaS, while they serve as a proof of concept that will enable newcomers to provide more advanced and likely to be accepted services.

Overall, there is emerging evidence that consumer demand from the millennials generation for MaaS like services/products is growing. This encompasses growing expectation for tailor-made services (e.g. routes for good weather, bad weather, most cost efficient, etc.) and an increased need for lifestyle information (e.g. retail, events, other commuters’ social network profiles, etc.) via one interface.

Mobility should be seen as an enabler for the fulfilment of primary needs (i.e. to visit a doctor, a school, a shop, etc). So if the primary need is met (e.g. delivery shop will bring you the purchase, or company will build a health centre next to you, it would prevent you from the need to travel. It is said that up to 31% of journeys can be managed through services and the infrastructure (it is necessary to know the needs
of the given site and why it generates traffic). Accordingly to literature [24], one household/family spends 200€/month on average for mobility (tickets, gas, parking fees, car insurance, garage rent fee...) [43]. This is a large market for MaaS investors to exploit. Growth of MaaS could cause the redistribution of current mobility expenditure or generate new expenditure from consumers demanding new services associated with their mobility needs.

All in all, each pain point of current mobility (costs, parking, personal space, cleanness) represents an opportunity for a MaaS providers to offer a solution to attract customers.

In this category, “Air quality” could be also clustered. As reported in the document “Reimage places: Mobility as a Service by KPMG [20], all transport authorities in major cities have air quality targets and are therefore keen to reduce congestion and the use of polluting forms of mobility.

9.3.3.2 Conceptual enablers & barriers

The Conceptual category concerns the adoption and deployment of new concepts and includes the deployment of TM2.0 concept as enabler and the reliability of exchanged data and the political acceptability as barriers for the MaaS deployment, as described below:

1) The implementation of the TM2.0 Concept as enabler of MaaS

MaaS is the integration of various forms of transport services into a single mobility service accessible on demand. To meet a customer’s request, a MaaS operator facilitates a diverse menu of transport options, such as for example: PT ride-, car- or bike-sharing, taxi or car rental/lease, or a combination thereof. For the user, MaaS can offer added value through use of a single application to provide access to mobility, with a single payment channel instead of multiple ticketing and payment operations. For its users, MaaS should be the best value proposition, by helping them meet their mobility needs and solve the inconvenient parts of individual journeys as well as the entire system of mobility services [85].

Assuming MaaS will be behaving as a digital Control Centre, the deployment of TM2.0 concept may prove to be an enabler for MaaS: current urban mobility centres are notoriously expensive, and focus on installing costly hardware in order to monitor traffic. TM2.0 allows the Traffic Management Centres to use data that are readily available from various partners and companies (not only by traditional detectors), and works multimodal. In other words: it takes all manner of transportation modes into account fulfilling one of the key MaaS layers [81].

While the main conceptual barriers emerged by the analysis are:

1) Ambiguous reliability of exchanged data

With respect to data availability, the biggest challenge is to make transport data complete regarding geographical coverage, real-time, transport modes, etc., and ensure high quality, reliability and validity. Apart from supporting the collection of missing data by the use of funding instruments, legislation and cooperation should lead the way.

Traffic Management services being one of the cornerstones of MyCorridor, it is worth investigating the data part originated from TMC’s and probe data feeding those services.

Traditional sensors on the road network, used by most TMCs, can give high quality information, but their acquisition and maintenance cost is very high and their road network coverage is very limited. Probe data, on the other hand, is cheaper to collect and obtain and can cover the entire road network, but their quality and reliability always depend on the service provider offering it. TMC’s are sometimes concerned about the reliability of probe data coming from connected devices and vehicles. A major question raised by some TMCs is why they should rely on information coming from external sources and how to measure the reliability of such data by using commonly agreed quality indicators. The Traffic
Flow Q-bench Task Force within TISA is in part tackling this issue, although it is not appropriate for raw data. The developed methodology still needs to be improved so that it can be consistently applied to various markets and environments but it is commonly accepted by both OEMs and service providers as the quality standard to be used in assessing the reliability of exchanged data. TMCs should define minimum requirements for data to be used by them. Before being able to broadcast raw data, a Service Provider should be somehow certified, while data coming from TMCs should be also certified [1].

2) Limited political acceptance and intervention

A lack of political or public acceptance can influence the implementation and effectiveness of MaaS. Political commitment is not only key to implement the required legal changes, but also to realise other supportive measures for MaaS deployment (e.g. financial support). Limited political acceptance and intervention generates uncertainty to investors and service providers. The MaaS ecosystem is a complex stakeholder network and hence a functional service system requires clear roles and responsibilities. Regulations and political decisions need to support and enable mobility services (e.g. open, common and defined technology and programming interfaces have to be specified).

It has been demonstrated that a lack of political or public acceptance of innovative Traffic Management can influence the implementation and effectiveness of innovative Traffic Management. An explicit policy of a city/road operator concerning the informed user should be in force. A policy means to have a clear goal and strategy to provide every user with available and reliable traffic information, which is beyond than only providing open data. Such a policy would support the acceptance of new approaches like innovative Traffic Management. Awareness about the need for such a policy should be raised, highlighting the potential benefits. Awareness actions could be organized via city-related and other relevant platforms [1].

3) New roles for public administrations

A particularly important role in the development of a fully open and sustainable MaaS ecosystem needs to be assumed by the public administration, both at a local and national level. Some public authorities are already moving beyond their traditional role as infrastructure providers by enabling and promoting mobility services of new entry-level players. The new digitally-powered mobility requires leadership that works with the global picture in mind, helping to move from a standalone vision to an interoperable and interconnected picture. Therefore, the public authorities may need to adopt new open working methods, and also include those who are keen to enter the market into the stakeholders' dialogue. Also the voice of users of the transport system should be taken into account.

4) New Business Models acceptance

In the context of MaaS paradigm, new business models shall be introduced and have to be accepted by major players participating. It is not yet clear how these will transform and will be accepted.

9.3.3.3 Technological enablers & barriers

This category is dealing with infrastructure features, availability of tools and technologies. An important group of barriers and enablers are the technical ones, including analysis on the adequacy of the existing infrastructural equipment, the importance of interoperability and standardization as well as issues related to data security.

In the following the main technological MaaS enablers are described:

1) Increase in penetration of reliable traffic information
Real time data are communicated to customers and transport providers, allow for better decision making and help improve routes, infrastructure. Nowadays more and more live traffic information is being distributed to the public with no additional costs, not only on web portals but also through mobile devices, for example smart phones. The exponential increase of usage of such information is directly correlated with the degree of awareness of the end user who is making the final use of it. The higher the usage of such services, the better the quality of the traffic information will be, because the probe data generated by such “mobile” users (estimated to 70% - 80% of generated traffic volume) may be used to enhance the quality of the provided service. Smart phone connected services, like social media, can accelerate the subscription adoption rate, which in turn will facilitate the use of other connected services, such as traffic information services, this will especially be the case outside Europe [1].

2) High penetration of Navigation Devices

Nowadays traffic information services can be provided to drivers via in-car devices. More specifically, drivers can receive real-time traffic information on incidents, congestion and weather before and during their drive. This has been greatly boosted due to the Global Navigation Satellite Systems (GNSS). In-car devices can be in-dash satellite navigation systems, personal navigation devices (PNDs) or smartphones. They all function as receivers in either or both communication protocols: TMC and/or TPEG. The market penetration of equipped vehicles is rising: “The market penetration rate of RDS-TMC receivers is expected to reach 100% by 2020 (i.e. device per vehicle)” [1].

The presence of receivers in the car environment will greatly support the concept of the MaaS as it is based on the optimal flow of data in and out of the car. The GNSS can serve as the main enabler for innovative Traffic Management, which could serve the current transport policies, which are more and more demanding in terms of low impact and seamless mobility. The high penetration of Navigation devices can definitely function as an enabler for Traffic Management Plans and Procedures to be effectively communicated to the individual driver/car taking into account their individual travel plan.

While, the following main technological barriers have surged:

1) Unaddressed interoperability and compatibility

As indicated in the white paper of the MaaS Alliance, in terms of technology, the critical points for MaaS are interoperability, roaming and harmonized standards [85]. Fostering interoperability is a common responsibility for all parties. An essential pre-requisite for the effective deployment of a MaaS ecosystem is an open middle-layer platform to connect the transportation service providers with the MaaS operator. This B2B platform, established with common rules common interfaces/APIs and consistent governance removes the need for each stakeholder to address technical and organizational obstacles individually. Interoperability and compatibility between different services (ITS or not) are aspects that can heavily affect the success of the MaaS implementation services.

A lack of standardisation of technologies is also one of the main barriers to the MaaS deployment. Interoperability and compatibility issues may occur between different countries or cities by using different technologies and/or standards, affecting transport users travelling in both countries/cities, e.g. as different transport operators use different, non-compatible electronic payment systems. These interoperability and compatibility issues affect transport users (discomfort), but also transport

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operators and authorities (increased costs) and MaaS providers (less opportunities to apply a service on multiple markets).

For example, in the project TM2.0, the Task Force 2 on Enablers and Barriers underline [1]:

A. **Lack of compatibility with legacy systems:** TMCs should be upgraded to be able to exchange information with vehicles and possibly become interoperable with them. Already existing legacy systems are likely to have technical restrictions or limitations to grow and adapt to new specifications. Public procurement processes that would be required for such upgrades are usually time consuming and complicated, especially when there is not a consolidated or premature business case behind. With the automotive industry evolving much faster than public administrations, this may become a major barrier.

B. **Lack of interface standardization for route/traffic management plan data between vehicles and service providers:** The standardization of the interface for data transfer and share of route plans, from connected navigation systems in vehicles, and Traffic Management plans, from TMC’s, will enable a seamless and provider/brand-independent interactive communication between vehicles and service providers. A state-of-the-art analysis is needed to identify already existing standards that partially support that need (e.g. DATEX II), to identify the gaps and to build on concrete scenarios and use cases, with the final aim to develop the required standards and specifications. This should be done in close cooperation with the involved stakeholders, like Standards Developing Organisations (SDOs), suppliers of navigational devices, automotive OEMs, Tier 1s, service providers.

C. **Lack of common standards for vehicle probe data and slow progress in standardization:** probe data and its applications are already being standardized by several international and national SDOs. Nevertheless, many of these standards are still not finalized and others will be needed. Furthermore, the relevant standards are developed by multiple SDOs and are not always consistent with each other. Excerpt of applicable standards are: ISO 22837- Vehicle Probe Data for Wide Area Communications specifies the architecture and data format for probe messages sent from vehicles, ISO 24100:2010 - Intelligent transport systems -- Basic principles for personal data protection in probe vehicle information services, ISO/TS 25114:2010 - Intelligent transport systems -- Probe data reporting management (PDRM), ISO/TS 25114:2010 provides a common framework for defining probe data reporting management (PDRM) messages to facilitate the specification and design of probe vehicle systems, ISO/TS 29284:2012 - Intelligent transport systems -- Event-based probe vehicle data specifies the probe data that shall be transmitted in the case that the event is happened, SAE J2735 - Dedicated Short Range Communications (DSRC) Message Set Dictionary defines standard data element and message contents and formatting for V2V and V2I information exchanges used in the U.S., ETSI TS 102 637-2 defines the standard message formats that are transmitted by every vehicle onboard- unit in a C-ITS environment. Message types also used for probe data include the Cooperative Awareness Message (CAM) and the Decentralized Environmental Notification Message (DENM). It should be ensured that the same data are sent in the same format from all sources, namely from all vehicles and mobile platforms. This can be achieved via harmonized standards, which would enable an open and vendor-independent collection of probe data both for road operators and service providers. More generally, standardization with regards to cooperative traffic information for drivers (e.g. "In-Vehicle Information" service) is needed to ensure regional independence of such services. In addition, standardization within the different SDO’s has to speed up in order to facilitate the swift deployment of cooperative ITS and enable interactive Traffic Management applications. Currently the standardization progresses very slowly due to different opinions about protocols to be used. Members in the relevant working group WG16 in CEN should decide on a usable protocol for data transfer soon.

2) **Unaddressed security and data management**
Problems with respect to data security are considered a relevant technical barrier for a large scale of MaaS deployment. For example, the widespread use of payment through contactless technologies (e.g. by smart mobility cards) exposes the users to greater risks of fraud, and to theft of personal data and money. With the progress in the integration of mobility services (key aspect of the MaaS policies) this potential vulnerability becomes more and more relevant. Data security issues does not only concern the users’ personal data or money, but also the data flow necessary for the interaction between various ITS components [68]. In a digital economy, the ownership and access to data determines the market dominance.

In order to build real multi-player, multi-option market platforms, service providers should provide each other access to essential information in a computer-readable format, including routes, timetables, stops, prices and accessibility information. Further on, ticketing and payment system interfaces should be accessible for other service providers (as reported in the white paper of MaaS alliance - Guidelines & Recommendations to create the foundations for a thriving MaaS Ecosystem - at page 10). Therefore, it is mandatory for a success MaaS deployment provide robust cyber security and data management facilities. Based on the analyses of the survey results obtained by a survey (spring 2017) on the critical regulatory enablers and barriers for the development and full deployment of MaaS commissioned by the MaaS Alliance and UK Transport Systems Catapult, information society (including data protection and privacy regulation) and consumer rights were considered ones of the most significant barriers. All in all, as revealed in the questionnaire survey carried out in MyCorridor project, indicated that: “Technological solution should ensure security of transactions and personal data, especially when multiple organisations are involved”.

3) Need for a mechanism for open location data

The map on which information is presented to the user may differ among applications and solutions, among partners and actors (present and future). Shared maps are not used by road operators or by TMCs, who on the contrary use their own network maps, which they have themselves developed over the years or using a proprietary digital map provided by one of the map providers. If it can be ensured that the information provision is independent of the map, this would ease the exchange between TMCs, vehicles and mobile units. A mechanism to facilitate this exchange between public-public, public-private and private-private actors should be put in place and agreed by involved actors (e.g. exchange of information between public and private service providers). Open and shared location data could be an enabler to enhance the exchange of traffic information independently from the map on which it is presented to the end customer [1].

4) Need for correct mobile network dimensioning

Several traffic solutions are based on mobile networks and might affect the service providers of cellular-based solutions for traffic information systems and location data services. Other solutions use real-time data extracted from the signalling of the mobile networks and active mobile phones. Furthermore, in a Traffic Management system, position and speed of the vehicles are usually sent over the mobile network to the traffic control centre. A 100% mobile strategy should always be followed by innovative Traffic Management services. The accuracy of these services will depend on the availability and quality of the network and temporal coverage. This, in turn, will greatly depend on the correct dimensioning of the mobile network according to the estimated data traffic for the expected number of users of such services. It is, however, envisioned that the mobile networks will continue to expand all over Europe [1].
9.3.3.4 Organisational enablers & barriers

This category includes aspects on overall interaction among the different entities having common goals and linked to external environment.

The following main organisational barriers have been recognised:

1) Lack of cooperation between stakeholders

Increased stakeholder cooperation in the value chain is recognised to be an important driver to stimulate MaaS deployment (Sources: MyCorridor internal survey & [85]).

The need of trust between the different actors and between them and users (e.g. passengers) is another challenge. This challenge relates to the need of financial transactions for buying tickets, but as well to payments between operators (related to services like data provision).

Beyond the required trust to allow all necessary transactions, some operators and competitors might not even be willing to share data and information in the first place because data ownership can also mean a competitive advantage that could require protection. As experience from local contexts shows, the required collaborative actor settings are sensitive and would be even more complicated on a European scale. Further promotion of the Directive as well as further legislative measures or other binding instruments will encourage and urge travel data sharing.

Therefore, depending on the cooperation level this factor can become a barrier or an enabler.

2) Ambiguous availability of skilled staff

The lack of skilled staff can also constitute an important barrier to the deployment of MaaS services. Competent human resources may be lacking because MaaS services are new and require a different set of skills.

As reported in the White Paper of MaaS Alliance, the role of “MaaS operator” does not yet exist in the conventional transport value chain and they are considered as "Emergence of a New Mobility Player". In some cases [68], this may prevent the cooperation of stakeholders especially in the public sector, to contribute to services operating outside their competent area. The lack can be also due to the reluctance of personnel to change or learn new technical skills. Still, new or specific skills implied are beyond technical expertise; they are more on business and operational side.

Additionally, organisational issues come into play in staff training when there is a lack of management support or the unwillingness of the companies’ decision makers to change. Organizations must endeavour to establish continuing professional programs for human resource development. Participation in MaaS dissemination activities should be encouraged, while transportation programs in Universities should incorporate ITS (including MaaS) related courses to prepare highly skilled people for the industry. In transportation organizations that have continued to favour conventional infrastructure, a cultural change is considered a must for MaaS deployment.

3) Lack of security infrastructure for cooperative vehicle data

As highlighted in the TM2.0 project [1], vehicle probe data provided via broadcast media must be secured via a complex security infrastructure, which is not in place yet. The security principles needed to ensure the integrity and privacy of vehicle data are currently being standardised. However, the required Public Key Infrastructure (PKI) with the defined hierarchy of Certification Authorities (CA) and the business model for these entities is not in place yet.
The C2C-CC intends to tender a Root CA which has to serve as the centre of trust for the entire PKI. In the long run, a European-wide neutral body should be responsible for this important function. OEMs will probably take the role of the long-term CA, responsible for providing certificates assigned to vehicles during production. The short-term CA’s which are needed to ensure the privacy should be managed by private companies. The financing of the CA’s could be done in a PPP model, where long-term certificates are part of the vehicle cost and the remaining parts of the PKI are financed by the public.

4) Need for common data formats for intermodal traffic information

Another barrier, emerged in the study carried out by the Task Force 2 on Enablers and barriers in the TM2.0 project, is the need for common data formats for intermodal traffic information. Intermodal traffic information for drivers is a complicated issue, as it requires cooperation and standardised data exchange as well as dynamic interaction between transport operators and road operators. This is even more true for international routes. Currently only a few countries provide transport data in an exchangeable format at all. Public authorities must regulate transport data exchange between data providers. Transport service providers and road operators must agree on common data formats.

While, the main organisational enablers are:

1) Establishment of MaaS alliance

Established at the ITS World Congress in Bordeaux in 2015, following the launch of the MaaS concept at the ITS European Congress in Helsinki in 2014, the MaaS Alliance is a public-private partnership working to establish foundations for a common approach to MaaS, and to unlock the economies of scale need for successful implementation and uptake of MaaS in Europe and beyond. The main goal of the Alliance is to facilitate a single, open market and full deployment of the MaaS services [85].

The MaaS Alliance, which now has more than 100 companies in membership, is working hard to find common ground. The alliance has set up four working groups: the first is looking into the single market to suggest fair competition and interoperability guidelines; the second is focusing on end-user needs and gap as well as service, design, social inclusion and environmental sustainability; the third is a legal group trying to find the best way to remove regulatory barriers and setup incentives to support MaaS business models; and the fourth group is all about technical standards, data protection and security [2Error! Reference source not found.].

Nevertheless, the establishment of a European led association tackling MaaS sets the ground for growth.

2) Universal mobility offers

“Universal mobility offers” refers to MaaS services being easily accessible and providing seamless and multimodal mobility solutions. In order to cover all mobility needs, MaaS offerings provide solutions for all possible user mobility requirements. It is important that people can be mobile on a 24/7 basis.

Therefore, mobility of people and goods has never been so easy thanks to MaaS, offering integrated multimodal transport solutions for the journeys reflecting the variety of needs and preferences of users. Users, being well informed and assisted during their journey, are always in control of their mobility without stress. In logistics, the punctuality and efficiency of the delivery is improved. Mobility as a Service eases the way we consume our mobility, based on the efficient deployment of advanced technologies and unleashing the full potential of data.”

Users seek a “frictionless” journey from A to B in a world that is “connected and intelligent”. MaaS aims to create a “mobility environment”. Everything needs to be connected. It is no good if users need 25
different apps. Users need to be able to get the information they need whenever and wherever they are. MaaS gives to people more choices and make their journeys more affordable and more personalized. MaaS get away from the traditional view of public transport, which is that ‘you start from a place that you didn’t want to start from, such as a bus stop, and end up in a place you don’t want to be. MaaS thinks door-to-door, but in a shared and public way [2].

Furthermore, when MaaS Services are easily accessible and have a low inhibition threshold for using them thanks to universal mobility, they can encourage people towards changing their mobility patterns towards a more sustainable and environmentally friendly mobility behaviour.

3) Progress of cooperative ITS data policy in Europe

As defined in the White Paper issued by MaaS Alliance, in a digital economy, the ownership and access to data determines the market dominance. In order to build real multi-player, multi-option market platforms, the service providers should provide each other access to essential information in a computer-readable format, including routes, timetables, stops prices and accessibility information. Further on, ticketing and payment system interfaces should be accessible for other service providers. The establishment of an open ecosystem can be encouraged by public procurement rules, requiring interoperability of ticketing and payment systems with other similar systems. Better access to travel planning data is, however, not sufficient. In order to make seamless multi-modal transport a reality, it is imperative that third parties can establish a secure real-time data -connection to the vehicles in their fleets. Without the ability of mobility operators to know what is going on with vehicles at any given point in time, MaaS will fail to materialize as the necessary preconditions for a fair and competitive marketplace will simply not exist.

Again, the same concept is highlighted in the report of the TM2.0 Task Force 2 on Enablers and barriers [1]. Cooperative vehicle data, in particular probe vehicle data provided via a future C-ITS infrastructure, is an important prerequisite for an interactive TM. To fulfil their traffic management mission, road operators need cooperative probe data, possibly even in raw format. Probe data are vital for ensuring traffic flow, thereby supporting also traffic safety.

Due to the memorandum of understanding signed by 11 major European OEMs (CAR 2 CAR Communication Consortium / C2C-CC) for the deployment of V2X technology in the vehicles in 2015 and the letter of intent of the Amsterdam Group (C2C-CC, ASECAP, POLIS, CEDR), to define standards and foster deployment in cooperation of road operators, cities and OEMs, it is expected that real-time traffic data as a Day One application will become a reality soon. The open data policy for cooperative probe data, as it is supported by the EC, the ITS Action Plan and the Priority Actions B and C as well, are therefore important enablers.

4) Stronger cooperation between stakeholders

There are various stakeholders whose committed participation in the development and implementation of MaaS is crucial to its success. The MaaS Alliance facilitates stakeholder cooperation through a shared work program engaging all relevant stakeholders, as discussed in section 4 of the current document.

Already, MaaS Alliance members from all sectors collaborate to create the enablers needed for successful deployment of MaaS in Europe and beyond [85]. Moreover, MaaS Alliance is working towards the development of an Application Programming Interface (API) in order to achieve a unified mobility ecosystem. API standards will set the route for future MaaS providers to create interoperable applications and will enhance cross-border collaboration as well as data collection in real time.

Finally, the emergence of MaaS schemes through different levels of collaboration between stakeholders, reveals that collaboration towards that direction is indeed getting stronger.
5) Smart Ticketing Alliance (STA)

In the same context, the activity of the **Smart Ticketing Alliance** (see more in section 5) is expected to play a strategic role, taking in mind the importance for MaaS deployment to have integrated and unique payments.

### 9.3.3.5 Business-related enablers & barriers

This category is related to the business impact and model. The lack of attractive or established business models is seen as an important barrier to the deployment of MaaS. As transport operators are often driven by a profit motive, they will participate in the large-scale deployment of MaaS services taken they are having clear financial benefits. Given the first success stories, more will follow giving a boost in this niche market. The question of who is responsible for investment costs becomes less of an issue as stakeholders become aware of the benefits of MaaS.

In detail, the **main identified business-related barriers** are the following:

1) **No clear business models**

It is not yet clear what will be the impact of the new forms of payment mechanism, autonomous vehicles, the growing popularity of bike-and car-share schemes or even the rise of distributed ledger or blockchain technology. In the report "**The perspective of cities and regions on Mobility as a Service**" elaborated by POLIS project [83], the network of European cities and regions working to develop innovative technologies and policies for local transport, focuses on the implications for urban and regional transport and warns of the dangers of a “purely commercial” approach to MaaS. While MaaS has the potential to deliver significant economic and environmental benefits, the report says that unless it is carefully regulated and structured, MaaS could increase inequality where premium levels of services are available to those who pay more. It is also mentioned that MaaS raised questions about the appropriate role of transport authorities and how to find the correct balance between the public and private sectors [73].

From the literature survey, it has emerged that in terms of integrated tickets, fare data is the most difficult to obtain, i.e. to get the price of a multimodal cross-border trip, particularly if reductions and short-time price adjustments are involved. From the users’ perspective a user-friendly and easy-to-use system would make multimodal travel more attractive, and it might be a key towards modal shift and enhancing accessibility of public transport.

Furthermore, the report of the Task Force 2 on Enablers and barriers, performed by TM2.0 project, underlines no clear return of investment for involved actors. In this report, we can read: "**The big question is who will afford the investment needed to upgrade the required systems. The TMCs should be convinced about the expected value from investing in innovative Traffic Management services. It is expected that handling probe data will be cheaper and easier for the TMC than maintaining own sensors. Still, in order to provide innovative Traffic Management services several additional transactions will be needed, some possibilities are the following. Some applications might require "extended data" that implies some pre-processing at the TMC/TIC level. Individual route plans from vehicles will either be directly transferred to Road Operators or via Service Providers, who will consolidate multiple route plans for use by Road Operators. Road Operators may have to be reimbursed for managing the communication network (e.g. DSRC) and providing traffic information. Road operators may require individual probe data, they may have to cover the costs for pre-analyzing traffic data and may be reimbursed for providing traffic data to Service Providers. Traffic information Service Providers may provide traffic analysis to Road Operators, they may have to reimburse Road Operators for traffic information and they will provide traffic information to drivers.**"
In order for the involved stakeholders to proceed with the required investments, the return of investment should be clear, possibly considering the above required transactions. A very clear understanding and harmonization of use cases by all involved stakeholders is needed, in order to reach consensus among them. The return of investment should not be based only on monetary profits. It should also take into account societal gains and benefits, like for example provision of better services to citizens and customers and the impact from them.

Finally, as emerged by the stakeholder’s interview, in most cases a complete mobility package should include services supplied by the private sector and the public sector (or supervised by the public authorities). This may lead to delays or dead ends because of different business objectives.

2) Users' privacy concerns

The users’ willingness to share data has to be strongly taken into account when designing MaaS services, as well as their concerns about privacy. Accurate traffic information is perceived as a standard service by drivers. Experience in Europe has shown that systems that can track location have been broadly accepted when there are clear advantages to using the system and when the consumers trust service providers to handle their personal data securely and responsibly within an explicit voluntary system.

User privacy in MaaS should tackle all the data they share themselves in order to get tailored services. Service providers have to share users’ data at some level with the mobility operator for the same purpose. This means that each MaaS stakeholder should take user privacy concerns into consideration through the entire MaaS channel. In addition, users should be aware of the benefits they get by choosing MaaS solutions to travel and give their consent to the processing of privacy data. Data management should be reflected in business models and incentives of the data-driven MaaS ecosystem.

Probe data is subject to EU national laws, specifically laws transposing EU Directives 95/46/EC (next EU Regulation 2015/679 (GDPR) in force from 25 May 2018) and 2002/58/EC as amended by Directive 2009/136/EU into the national laws of the EU28 Member States. “Collecting probe data from a car using a public telecommunications network requires freely given, prior, informed consent in those cases where the probe data is not strictly necessary for the delivery of an information society service explicitly requested by the driver”[2]. According to EU law, location data continuously obtained from a car is also regarded as sensitive personal data. Location, speed data and g-force data obtained through probe data should not be kept in identifiable form for longer than 24 hours.

Most of the Service Providers are able to fully comply with privacy laws and they make use of some sort of ‘privacy by design’ schemes. For example, a short text will always appear when the Personal Navigation Device (PND) or in-dash solution is turned on in a vehicle, informing the driver on the planned use of data coming from this device and asking for the driver’s consent. If the consent is indeed granted, the data received by the device are anonymized and not stored in the device.

These procedures should be made very explicit to users, so as to settle down their concerns. Still, apart from probe data themselves, it has to be secured that privacy is not undermined by fusing probe data with data from other sensors (e.g. traffic cameras).

Furthermore, as reported in the article [2], during the ITS International’s recent MaaS Market conference in London, the role that enabling legislation will play has been recognised. The key “requirements” for “mass MaaS deployment” are:

A. “support from public administrations and agencies;

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[2] Extract from Interim report. Probe Data Working Group (iMobility)
B. massive trust and take-up by users;
C. open (not necessarily free) access to transport system data;
D. user roaming and payment clearing across MaaS schemes;
E. an account-based payment framework.

This is what will lead to requirements for standards and consensus. To get to this consensus, the MaaS sector needs to think about things like privacy protection, data security and incentive schemes. This needs to be a minimum service level and a standardised level of availability for the service at all times. The industry needs to agree on roaming and an international cross-scheme payment clearing body as well as account-based ticketing.

Furthermore, principles of fairness and non-discrimination have to be applied, in addition to clarifying liability and ensuring data protection.

While, the key business-related enablers are related to:

1) Political pressure for change

A growing number of government and local authorities look for new ways to deal with transportation crises in both urban and rural areas alike. The economic impact of severe congestion and poor connectivity, along with increasing concerns about the health of citizens living in areas of poor air quality are creating huge political pressure for change. This pressure is also translated in: i) Regional budget resources; ii) Incentives for sustainable transport, and for organizations to support such; iii) Procurement procedures modified to support mobility instead of transportation; iv) Urban planning including densification, changing parking norms, etc.

Societies are rethinking transportation provision with massive implications for vertical transport providers, regulators, local and national governments and their many suppliers. The growth of interest in MaaS and similar transport as a service concepts has been underlined by the recent publication of a series of reports from both commercial consultants and official bodies [73].

2) Public-Private partnerships

Finally, enhanced public-private partnerships (PPP) are seen as an important enabler to incentivise the deployment of ITS services in general and MaaS in particular. In [68], it is stated that the successful deployment of ITS cannot be achieved without the cooperation and understanding of both the public and private sector. Also, the White Paper of MaaS Alliance recommends that public authorities encourage MaaS to collaborate with the private industry for the development of innovative business models. In turn, this opens both opportunities and questions relating to funding, and consideration must be given to the appropriate contractual framework to be followed, which will be led by the relevant transport authority.

9.3.3.6 Legal-related enablers & barriers

This section explores at a high level some of the enablers and barriers that MyCorridor may face as a result of legal and regulatory requirements. The potential impact of legal barriers must be considered as these barriers can sometimes be conceived as harder to overcome when compared with technical and operational barriers, which can often be resolved over shorter periods. Overall, the existing legal framework which consists largely of mode-specific laws and regulations, together with the lack of a harmonisation across EU member states can represent key barriers for the deployment of ITS systems in general, as well as for MaaS services specifically.
In some countries, the law explicitly forbids the roll-out or adaptation of a particular technology. Innovative ITS services often have difficulty developing due to the differing legal frameworks across jurisdictions, as evidenced in the EU VRUITS project (ended March 2016, http://www.vruits.eu/).

Allocation of liability within a MaaS system can also present challenges (e.g. who is responsible in case of service malfunctioning, poor service, or in case of wrong data provision?). This requires consideration and discussion between the relevant parties at an early stage.

Data protection laws can be considered a legal barrier, as the successful development of a MaaS service is reliant on access to various types of data, (as indicated in the White paper titled “The future of Mobility as a service: A case for EU and Irish research” by TSSG: "the privacy and security related to user data is of immense importance in the MaaS"). Whilst the EU’s General Data Protection Regulation (EU 2016/679) (“GDPR”) (which comes into force on 25 May 2018) will largely harmonise data protection laws within the EU, MaaS service providers must ensure that management of this data is in compliance with all applicable data protection laws. This can be challenging, especially in light of more stringent data protection requirements as contained in the GDPR.

In addition, e-payment and competition laws and regulations must be taken into account for MaaS deployment, as discussed further below.

Main legal barriers:

1) Allocation of liability

Allocation of liability, both between operators and transport service providers and with consumers can present commercial and legal challenges, particularly if this allocation has not been considered early on in the development of a MaaS platform - who is liable and to what extent? Does liability sit with the provider of the mobility service or the MaaS platform provider? In general, MaaS deployment needs to implement a customer oriented scheme in compliance with consumer protection legislation. To minimise the impact of such challenges, it is important to consider the contractual framework at an early stage in the development of a MaaS model.

2) Unspecified ownership of data

Access to various categories of data is key to providing an efficient and tailored MaaS service to individuals. Therefore, it is important to consider who owns which data, who is the data controller, who is the data processor and the legal grounds for accessing, processing and sharing that data.

MaaS Alliance states that:

"In a digital economy, the ownership and access to data determinates the market dominance. In order to build real multi-player, multi-option market platforms, the service providers should provide each other access to essential information in a computer-readable format, including routes, timetables, stops, prices and accessibility information."

Further, MaaS Alliance indicates “The clear definition and secured ownership of data” as one of the main relevant building blocks of a European single market for Mobility as a Service [85].

For example, many MaaS stakeholders are interested in vehicle data. OEMs are primarily interested in vehicle identification data; traffic service providers and road operators are primarily interested in vehicle location data; and insurance companies benefit from vehicle data relating to the driver’s behaviour (i.e. speed limit and other violations). It is not always clear who owns such data – is it the individual vehicle owner; the car manufacturer; or the road operator? Whilst certain vehicle data may be considered as personal data, belonging to the individual car-user, this needs to be considered
carefully and where necessary, appropriate legal agreements need to be in place to ensure that data is validly collected, processed and shared in accordance with all applicable laws and regulations.

3) Data protection

In addition to the above mentioned data, MaaS platforms will need to process various other categories of personal data in order to deliver a tailored service to end-users. This includes (but is not limited to), GPS location data, names, addresses and payment information. However, it is important to note that the GDPR extends the scope of the definition of personal data. Therefore, as a minimum, MaaS service providers must ensure that they have appropriate technical and organisational systems in place to protect all data that is handled by them, in accordance with all applicable data protection laws and where possible, data must be anonymised or pseudonymised.

Trust has to be maintained between customers and transport service providers. This may be achieved by carrying out a Privacy Impact Assessment early on in the development of the MaaS model (to be consulted and updated regularly) and through on-going transparency, well-defined customer-facing service level agreements, terms and conditions and privacy policies. At a basic level, the use of data will enable MaaS systems to predict transport demands based on past traffic trends and transport usage, to assist mobility operators in allocating different modes of transport according to their availability, traffic congestion and individual user preferences.

Some MyCorridor survey responses revealed individuals’ concerns over the use of their personal data and the need to increase security and protection of this data. Whilst data protection legislation may initially be considered a barrier to the development of a MaaS network, the GDPR aims to harmonise data protection laws across the EU. As a result, this could facilitate the use and processing of personal data between MaaS service providers located in different member states. By demonstrating compliance with the GDPR and other data protection legislation, MaaS operators and service providers may increase the level of consumer trust in their services.

4) Financial services laws and regulations

MyCorridor’s aim is to allow users to book and pay for cross-border journeys via a one-stop shop - a platform offering multi-modal transport solutions via one single user interface.

On-line platforms which provide services to facilitate payments may be regulated from an EU level in relation to these payments. For example, it is possible that MaaS models, including MyCorridor, will fall within the scope of the EU’s Payment Services Directive 2 ("PSD2"). If a platform does fall within the scope of PSD2, there will also be authorisation requirements and on-going compliance burdens. That said, there are exclusions which certain platforms may be able to benefit from if within the scope of PSD2; however, this will depend on the corporate structure and the payment flow within the specific MaaS platform. Possible exclusions include: the Limitation Network Exclusion; the Commercial Agent Exclusion; and the Electronic Communications Exclusion. It is important to note that should an exclusion apply, there may be notification requirements to the relevant regulatory body, before the platform can benefit from that exclusion. Further, whilst the Commercial Agent Exclusion could apply to a MaaS platform this exclusion has recently been narrowed under PSD2 ostensibly to capture online market places.

PSD2 is intended to harmonise payments law across the EU; however, national regulators may interpret PSD2 differently and therefore consideration must also be given to the location of the relevant MaaS entity.

Anti-money laundering
In the event a MaaS platform is caught by PSD2, it will also be caught by anti-money laundering laws and regulations. Once again, this will depend on the corporate and payments structure of the relevant MaaS platform. The application of anti-money laundering laws and regulations may require a MaaS platform to carry out customer due diligence (identification and verification measures).

When designing the MyCorridor payment set-up, consideration must be made in advance to potentially applicable payment regulations and legislation, to ensure that MyCorridor remains at all times compliant with payment services legislation.

5) Competition regulations

As mentioned above, the MyCorridor project aims to become a “one-stop shop” platform where two major stakeholder categories are foreseen. On the one hand, MyCorridor introduces a gateway for service providers who are willing to register their services and make them available in the project ecosystem; on the other hand, end-users can secure and access their travel needs all in one place, via one mobile application. MyCorridor will have to ensure a level playing field for transport operators seeking access to MyCorridor’s platform.

6) Unsupportive regulation and legal framework

Currently, most member states do not have MaaS specific legislation. Legislation and regulations are largely transport mode-specific and country specific. This can create barriers, particularly in relation to cross-border MaaS services. The development of a more tailored and harmonised supportive legal framework would facilitate the growth of innovative ITS services and MaaS models. As identified in section 5, European policy discussions, initiatives and measures appear to be moving in this direction.

The following main legal enablers are identified:

1) Crypto-currency assets

MaaS services may be designed to incorporate a crypto-currency - a digital currency that uses cryptography to secure financial transactions. The MyCorridor survey demonstrated the opportunities associated with the use of crypto-currency in MaaS services. However, the use of crypto-currencies is still emerging and in many countries, crypto-currencies are not considered legal tender to the extent that they are not afforded the same extensive regulatory protections and restrictions as common currencies. As a result, MaaS service providers using crypto-currencies would need to focus on building a relationship of trust with customers and passengers and must remain conscious of wider customer and passenger perceptions.

2) Geo-blocking Regulation

From 20 December 2018, the European Union's Regulation on Geo-Blocking (Regulation (EU) 2018/302) will come into force. This Regulation will prevent the on-line blocking of customers accessing websites of traders from other EU countries, outside of that individual's own member state. MaaS services may benefit from the Regulation which should enable users to access MaaS services wherever they are in Europe.

9.3.4 Barrier/enabler factor prioritisation

The following two tables summarise the identified enablers and barriers and assigns priorities to them (scale “-2” to “+2”). Each enabler/barrier impact priority has been calculated as weighted average value of the aggregated questionnaires results of the post-feedback survey.
It seems that those barriers related to the collaboration between stakeholders, the interoperability and compatibility, the security and data management, the new roles to be undertaken by the public administration and the new and still unclear business models ambiguous adoption overall, are the ones recognised to have the greatest impact in MaaS development and penetration.

Table 11: Prioritised impact of recognised barriers.

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Impact priority (weighted average value)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>User &amp; market</strong></td>
<td></td>
</tr>
<tr>
<td>Lack of user acceptance</td>
<td>0,8</td>
</tr>
<tr>
<td>Limited understanding of user needs</td>
<td>0,4</td>
</tr>
<tr>
<td><strong>Conceptual</strong></td>
<td></td>
</tr>
<tr>
<td>Ambiguous reliability data exchange</td>
<td>0,4</td>
</tr>
<tr>
<td>Limited political acceptance and intervention</td>
<td>0,4</td>
</tr>
<tr>
<td><strong>New roles for public administrations</strong></td>
<td></td>
</tr>
<tr>
<td>New business model acceptance</td>
<td>1</td>
</tr>
<tr>
<td><strong>Technological</strong></td>
<td></td>
</tr>
<tr>
<td>Unaddressed interoperability and compatibility</td>
<td>1,2</td>
</tr>
<tr>
<td>Unaddressed security and data management</td>
<td>1,2</td>
</tr>
<tr>
<td>Need for a (currently missing) mechanism for open location data</td>
<td>0,2</td>
</tr>
<tr>
<td>Need for (currently missing)correct mobile network dimensioning</td>
<td>0,2</td>
</tr>
<tr>
<td><strong>Organizational</strong></td>
<td></td>
</tr>
<tr>
<td>Lack of stakeholder cooperation</td>
<td>1,2</td>
</tr>
<tr>
<td>Ambiguous availability of skilled staff</td>
<td>-0,4</td>
</tr>
<tr>
<td>Lack of security infrastructure for cooperative vehicle data</td>
<td>0</td>
</tr>
<tr>
<td>Need for (currently missing) common data formats for intermodal traffic information</td>
<td>0</td>
</tr>
<tr>
<td><strong>Business</strong></td>
<td></td>
</tr>
<tr>
<td>No clear business model</td>
<td>1,4</td>
</tr>
<tr>
<td>Users’ privacy concern</td>
<td>0,2</td>
</tr>
<tr>
<td><strong>Legal</strong></td>
<td></td>
</tr>
<tr>
<td>Allocation of liability</td>
<td>0,4</td>
</tr>
<tr>
<td>Unspecified ownership of data</td>
<td>0,6</td>
</tr>
<tr>
<td>Data protection</td>
<td>0,6</td>
</tr>
<tr>
<td>Financial services laws and regulations</td>
<td>0,4</td>
</tr>
<tr>
<td>Competition regulations</td>
<td>0,8</td>
</tr>
<tr>
<td>Unsupportive regulation and legal framework</td>
<td>0,8</td>
</tr>
</tbody>
</table>

On the other hand, the enablers that are expected to have the greatest impact are basically the higher level of end user’s involvement, the increased attention for sustainable transport, the need for flexible and personalised services, the increase of reliable traffic information and all those related to organisational aspects, such as MaaS alliance, universal mobility offers, progress of cooperative ITS data policy in Europe, more cooperation between stakeholders and the activity of the Smart Ticketing Alliance as well as the political pressure for change and the Public-Private Partnerships.
### Table 12: Prioritised impact of recognised enablers.

<table>
<thead>
<tr>
<th>Enablers</th>
<th>Impact priority (weighted average value)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>User – Market</strong></td>
<td></td>
</tr>
<tr>
<td>Higher level of end user’s involvement</td>
<td>1</td>
</tr>
<tr>
<td>Increased attention for sustainable transport</td>
<td>1,2</td>
</tr>
<tr>
<td>MaaS potential to offer flexible and personalised services</td>
<td>1</td>
</tr>
<tr>
<td>Trends supporting MaaS Growth</td>
<td>0,8</td>
</tr>
<tr>
<td><strong>Conceptual</strong></td>
<td></td>
</tr>
<tr>
<td>TM2.0 Concept</td>
<td>0,2</td>
</tr>
<tr>
<td><strong>Technological</strong></td>
<td></td>
</tr>
<tr>
<td>High penetration of Navigation Devices</td>
<td>0,8</td>
</tr>
<tr>
<td>Increase of reliable traffic information</td>
<td>1,2</td>
</tr>
<tr>
<td><strong>Organizational</strong></td>
<td></td>
</tr>
<tr>
<td>Establishment of MaaS alliance</td>
<td>1,2</td>
</tr>
<tr>
<td>Universal mobility offers</td>
<td>1,6</td>
</tr>
<tr>
<td>Progress of cooperative ITS data policy in Europe</td>
<td>1,2</td>
</tr>
<tr>
<td>Stronger cooperation between stakeholders</td>
<td>1,2</td>
</tr>
<tr>
<td>Smart Ticketing Alliance</td>
<td>1,6</td>
</tr>
<tr>
<td><strong>Business</strong></td>
<td></td>
</tr>
<tr>
<td>Political pressure for change</td>
<td>1,2</td>
</tr>
<tr>
<td>Public-Private Partnerships</td>
<td>1</td>
</tr>
<tr>
<td><strong>Legal</strong></td>
<td></td>
</tr>
<tr>
<td>Crypto-currency assets</td>
<td>-0,6</td>
</tr>
<tr>
<td>Geo-blocking rules</td>
<td>0</td>
</tr>
</tbody>
</table>

#### 9.3.5 Stakeholders relevance for each barrier/enabler factor: consolidated results

The following two tables summarise the identified enablers and barriers and assigns to each of them the main stakeholders. Each stakeholder relevance for each identified barrier/enabler is rated on a scale from -2 (lowest) to +2 (Highest relevance) and it has been calculated as weighted average value of the surveys conducted (internal and external to the project; subjective and objective merging).

### Table 13: Relevance level of key stakeholders for each barrier.

<table>
<thead>
<tr>
<th>Type</th>
<th>Barriers</th>
<th>Government</th>
<th>City</th>
<th>Mobility Operator</th>
<th>Transport Provider</th>
<th>Technology Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>User/Market-related</strong></td>
<td>Lack of user acceptance</td>
<td>0,4</td>
<td>0,8</td>
<td>1</td>
<td>0,8</td>
<td>0,6</td>
</tr>
<tr>
<td></td>
<td>Limited understanding of user needs</td>
<td>0</td>
<td>1</td>
<td>1,4</td>
<td>0,6</td>
<td>1</td>
</tr>
<tr>
<td>Type</td>
<td>Barriers</td>
<td>Government</td>
<td>City</td>
<td>Mobility Operator</td>
<td>Transport Provider</td>
<td>Technology Provider</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------------------------------</td>
<td>------------</td>
<td>------</td>
<td>-------------------</td>
<td>--------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Conceptual</td>
<td>Ambiguous reliability of data exchanged</td>
<td>0,8</td>
<td>0,8</td>
<td>1,2</td>
<td>1</td>
<td>1,4</td>
</tr>
<tr>
<td></td>
<td>Limited political acceptance and intervention</td>
<td>1,8</td>
<td>1,6</td>
<td>0,2</td>
<td>0,2</td>
<td>-0,2</td>
</tr>
<tr>
<td></td>
<td>New roles for public administrations</td>
<td>1,2</td>
<td>1,6</td>
<td>0,6</td>
<td>0,6</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>New business model acceptability</td>
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<td>0,8</td>
<td>1,6</td>
<td>1,2</td>
<td>1</td>
</tr>
<tr>
<td>Technological</td>
<td>Unaddressed interoperability and compatibility</td>
<td>Not Answered</td>
<td>Not Answered</td>
<td>Not Answered</td>
<td>Not Answered</td>
<td>Not Answered</td>
</tr>
<tr>
<td></td>
<td>Unaddressed security and data management</td>
<td>0,6</td>
<td>0,4</td>
<td>0,8</td>
<td>0,4</td>
<td>1,4</td>
</tr>
<tr>
<td></td>
<td>Need for a (currently missing) mechanism for open location data</td>
<td>0,4</td>
<td>0,8</td>
<td>0,8</td>
<td>0,8</td>
<td>0,8</td>
</tr>
<tr>
<td></td>
<td>Need for (currently missing) correct mobile network dimensioning</td>
<td>0,4</td>
<td>0,2</td>
<td>0,2</td>
<td>0,2</td>
<td>1</td>
</tr>
<tr>
<td>Organisational</td>
<td>Lack of stakeholder cooperation</td>
<td>1</td>
<td>1,2</td>
<td>1,2</td>
<td>1,4</td>
<td>0,8</td>
</tr>
<tr>
<td></td>
<td>Ambiguous availability of skilled staff</td>
<td>0</td>
<td>0,6</td>
<td>1</td>
<td>1</td>
<td>0,4</td>
</tr>
<tr>
<td>Type</td>
<td>Barriers</td>
<td>Government</td>
<td>City</td>
<td>Mobility Operator</td>
<td>Transport Provider</td>
<td>Technology Provider</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------------------------------------</td>
<td>------------</td>
<td>------</td>
<td>-------------------</td>
<td>--------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Business-related</td>
<td>Lack of security infrastructure for cooperative vehicle data</td>
<td>0,8</td>
<td>0,4</td>
<td>0,6</td>
<td>0,6</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Need for (currently missing) common data formats for intermodal traffic information</td>
<td>0,6</td>
<td>0,4</td>
<td>0,6</td>
<td>1</td>
<td>1,2</td>
</tr>
<tr>
<td></td>
<td>No clear business model</td>
<td>0,6</td>
<td>0,8</td>
<td>1</td>
<td>1,4</td>
<td>0,8</td>
</tr>
<tr>
<td></td>
<td>Users’ privacy concern</td>
<td>1</td>
<td>0,8</td>
<td>1</td>
<td>0,8</td>
<td>0,6</td>
</tr>
<tr>
<td></td>
<td>Allocation of liability</td>
<td>1</td>
<td>1,2</td>
<td>0,6</td>
<td>0,6</td>
<td>0,4</td>
</tr>
<tr>
<td></td>
<td>Unspecified ownership of data</td>
<td>0,6</td>
<td>0,8</td>
<td>1</td>
<td>0,6</td>
<td>0,6</td>
</tr>
<tr>
<td>Legal</td>
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<td>0</td>
<td>0,6</td>
<td>0,6</td>
<td>0,4</td>
</tr>
<tr>
<td></td>
<td>Financial services laws and regulations</td>
<td>1,2</td>
<td>-0,2</td>
<td>0</td>
<td>-0,2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Competition regulations</td>
<td>1</td>
<td>1</td>
<td>0,6</td>
<td>0,6</td>
<td>0,2</td>
</tr>
<tr>
<td></td>
<td>Unsupportive regulation and legal framework</td>
<td>1,8</td>
<td>1,4</td>
<td>0,2</td>
<td>0,2</td>
<td>0,2</td>
</tr>
</tbody>
</table>
Table 14: Relevance level of key stakeholders for each enabler.

<table>
<thead>
<tr>
<th>Type</th>
<th>Enablers</th>
<th>Government</th>
<th>City/Authorities</th>
<th>Mobility Operator</th>
<th>Transport Provider</th>
<th>Technology Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>User &amp; Market</td>
<td>Higher level of end user's involvement</td>
<td>0,2</td>
<td>0,8</td>
<td>1</td>
<td>1,2</td>
<td>0,4</td>
</tr>
<tr>
<td></td>
<td>Increased attention for sustainable transport</td>
<td>1,8</td>
<td>2</td>
<td>1,4</td>
<td>1,2</td>
<td>0,6</td>
</tr>
<tr>
<td></td>
<td>MaaS solutions potential to offer flexible and personalized services</td>
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<td>0,8</td>
<td>1,8</td>
<td>1,2</td>
<td>1,4</td>
</tr>
<tr>
<td></td>
<td>Trends supporting MaaS Growth</td>
<td>0,4</td>
<td>0,8</td>
<td>1,6</td>
<td>1,2</td>
<td>1,6</td>
</tr>
<tr>
<td>Conceptual</td>
<td>TM 2.0 Concept (<a href="http://tm20.org/">http://tm20.org/</a>)</td>
<td>0,6</td>
<td>1,2</td>
<td>0,6</td>
<td>0,4</td>
<td>1</td>
</tr>
<tr>
<td>Technological</td>
<td>High penetration of Navigation Devices</td>
<td>Not Answered</td>
<td>Not Answered</td>
<td>Not Answered</td>
<td>Not Answered</td>
<td>Not Answered</td>
</tr>
<tr>
<td></td>
<td>Increase of reliable traffic information</td>
<td>0,8</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1,2</td>
</tr>
<tr>
<td>Organisational</td>
<td>Establishment of MaaS Alliance</td>
<td>0,2</td>
<td>1,2</td>
<td>1,6</td>
<td>1</td>
<td>1,2</td>
</tr>
<tr>
<td></td>
<td>Universal mobility offers</td>
<td>0,6</td>
<td>1,4</td>
<td>1,4</td>
<td>1,2</td>
<td>1,6</td>
</tr>
</tbody>
</table>
### Progress of cooperative ITS data policy in Europe

<table>
<thead>
<tr>
<th>Type</th>
<th>Enablers</th>
<th>Government</th>
<th>City/Authorities</th>
<th>Mobility Operator</th>
<th>Transport Provider</th>
<th>Technology Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Progress of cooperative ITS data policy in Europe</td>
<td>1.2</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>Stronger cooperation between stakeholders</td>
<td>1</td>
<td>1.4</td>
<td>1.4</td>
<td>1.6</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>Smart Ticketing Alliance</td>
<td>0.6</td>
<td>1</td>
<td>1.6</td>
<td>1.2</td>
<td>1.6</td>
</tr>
</tbody>
</table>

**Business**

<table>
<thead>
<tr>
<th>Type</th>
<th>Enablers</th>
<th>Government</th>
<th>City/Authorities</th>
<th>Mobility Operator</th>
<th>Transport Provider</th>
<th>Technology Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Political pressure for change</td>
<td>1.8</td>
<td>1.6</td>
<td>0.8</td>
<td>0.4</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>Public-Private Partnerships</td>
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<td>1.2</td>
<td>0.8</td>
<td>0.6</td>
<td>1</td>
</tr>
</tbody>
</table>

**Legal**

<table>
<thead>
<tr>
<th>Type</th>
<th>Enablers</th>
<th>Government</th>
<th>City/Authorities</th>
<th>Mobility Operator</th>
<th>Transport Provider</th>
<th>Technology Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crypto-currency assets</td>
<td>0</td>
<td>-0.2</td>
<td>0</td>
<td>0</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>Geo-blocking rules</td>
<td>0.8</td>
<td>-0.4</td>
<td>-0.2</td>
<td>-0.2</td>
<td>0.2</td>
</tr>
</tbody>
</table>

### 9.4 Exploration of the impact of external megatrends in MaaS

#### 9.4.1 Introduction

This section and to complement the barriers and enablers that have been identified and discussed above takes a prospective outlook on **megatrends** that will impact MaaS deployment solutions and their implications on the future relevance of barriers and enablers. Desk research findings from the European project (NEWBITE), scientific articles and results obtained during the 1st MyCorridor workshop have been used as the key feedback sources for this list that is not aiming to be exhaustive, but it aims to provide a primary guide that will definitely be revised until the end of the project and the knowledge acquired during its life.
As such, **4 key megatrends** have been recognised to have impact on MaaS deployment in the medium term, namely: **urbanisation, sustainability (environmental challenges), demography and travel trends towards multimodality.**

### 9.4.2 Urbanisation and growing investments in smart cities

During the last decade, technological advancements and economic growth in urban areas has led to the progressive desertion of rural areas towards the cities, hence, causing the densification of the cities [68]. Mr Christopher Irwin, from European Passengers’ Federation, during the 1st MyCorridor workshop underlined that:

- 75% of EU’s population lives in urban agglomerations – and rising
- 85% of EU’s GDP (Gross Domestic Product) generated in urban areas

This trend has been posing some major threats to the cities; such as: the increase of congestion, land use and pollution, impacting negatively on the quality of life of citizens (as also recognised by Mr Christopher Irwin).

Possible solution to urbanisation issues is now linked to smart city implementations. Smart cities have become a global trend conceived as a response to the increasing urbanisation challenge in cities for sustainability. The European Parliament has published a report in 2014 mapping smart cities in the European Union, where it is reported that in 468 cities of about 100,000 inhabitants, 240 ‘smart cities’ (about half) are identified (larger cities tend to be capable of being smarter than smaller ones). In this context, urban MaaS is an integral part of the whole smart city initiative.

For the roll-out of MaaS solutions, this means that we will continue to see more commitments from cities. Cities are becoming more and more interested because of benefits related to reduction to traffic congestion and environmental footprint (increasing political commitment). Additionally, urbanisation and smart city initiative trends will make it easier to make an economic argument for urban MaaS implementations that would otherwise have been difficult in rural areas. In other words, more attractive business cases for MaaS service will probably arise.

### 9.4.3 Sustainability – Environmental challenges

The increasing concern for sustainability has grown in recent years, and in particular, sustainable transportation will be a major boost for MaaS innovations as the transport sector continues to face challenges of safety, air pollution and traffic congestion.

Silva at al. [69], discuss the various trends in the demand for transportation system up to 2030 and beyond. In their report, environmental challenges have been pinpointed as one of the most significant global trends of the 21st century. Climate change is a global phenomenon caused by excessive greenhouse gas emissions. It has a negative impact on the environment, economy and society, leads to extreme weather conditions and affects the land use negatively. Transportation is responsible for 20% of all CO₂ emission with around 75% being caused by road transport. Air pollution has a negative impact on local air quality and human health and is caused by traditional fuel burning engines.

In the near future, MaaS is expected to play a major role in the CO₂ emission reductions in transport (e.g. the shift from private modes to public and active modes supports the targets for declining emissions).

Political commitment is expected to improve since they have the knowledge of the current problems and solutions. As a result, all hands will be on deck to break down some of the organizational barriers as much as possible.
9.4.4 Demography – global population grown

The world’s population was estimated to have reached 7.6 billion as of December 2017 [86]. The population is currently growing quite rapidly, future changes are influenced by difficult-to-predict factors such as economic development, cultural changes, migration, and natural disasters. One of the major trends leading to this population growth in the period to 2013 is the increase in life expectancy and decline in birth rates which have become the major driving forces behind the global again population. In the EU, the number of people over 65 is projected to account to roughly 23% compared with the 16% of today [68]. As a consequence, there would be a significant increase in demand for healthcare services due to prevalence of chronic diseases in elderly population. This trend will create further opportunities for MaaS solution for senior citizens and vulnerable road users. As a result, it will generate business opportunities that will otherwise require new business models.

The Department of Economic and Social Affairs of the United Nations forecasts a projected increase of almost 0.4 billion population in the 15-34 age group of the world population by 2020. This age group are important customers of the future and, specifically in favour of MaaS, as they are techno savvy and connected 24/7, demanding and impatient, civic and environmental friendly [68].

9.4.5 Travel Trend: Multimodality

Multimodality is another mega mobility trend, as the tendency of young adults to use multiple modes of transport has been on the rise in recent years [57]. The European Commission has called for 2018 to be the "Year of Multimodality" - a year during which the Commission will raise the importance of multimodality for the EU transport system. Since 2010, the European Commission recognised the increasing demand for European and multimodal services to provide EU-wide Real-Time Traffic and Travel Information services [11]. Some of the objectives outlined are: fair and transparent access to public data, promotion of public-private co-operation, increase in data quality, improvement in multi-modal co-operation, and encouraging (cross-border) data exchange. In this same Action Plan (1.5), actions were stated for the support of development of national, multi-modal travel planners and their EU-wide interconnection for multimodal journey planners [11].

Mr Christopher Irwin, from European Passengers’ Federation, during the 1st MyCorridor workshop underlined that "Multimodality" is enabling more efficient mobility, the potential of digitalization and is matching supply and demand more sustainably.

With this trend, there is a need for cooperation between stakeholders in the private and public sectors in order to provide users with a seamless travel experience. For mature cities with a high share of sustainable transport modes, the next step must be to fully integrate the travel value chain to foster seamless, multimodal mobility while ensuring “one face to the customer” and to increase the overall attractiveness of public transport by service extension. This trend will enhance public-private partnerships and will support for the definition of the new roles of public administrations.

9.4.6 Conclusion

As illustrated above, the four identified megatrends may significantly affect the current barriers and enablers for the deployment of MaaS services. Urbanisation, more attention for sustainability and increased multimodality may result in more political commitment to implement MaaS solutions. Furthermore, opportunities for more attractive business models are expected due to urbanisation (relatively compact application areas for ITS services with many potential users) and demographic trends (ageing populations may ask for other, more profitable mobility solutions). Finally, user acceptance may increase as well due to the inevitable profile of the new generation, who are more...
inclined to new technologies than older generations. Finally, the increased demand for multimodal transport requires even more cooperation between stakeholders, increasing the current challenge with respect to this issue.

10 MaaS impact

10.1 Introduction

MaaS is based on existing technologies but brings a core innovation, as it gives the MaaS aggregator the ability to bring together standard Transport Operator services using a single access digital platform. The aggregator business model (see "Integrator BM" in section 6.6) is well known in other sectors; one example in the retail sector is Amazon.com. However, the extension of this model to transport services will bring a number of impacts to society, economy, environment and business.

MaaS is expected to have a big impact in society in terms of travel behaviour, transport sector and policy intervention. More specifically:

- Through new business models and technology, many of the transport challenges can be addressed.
- Policy makers can affect travel behaviour and manage travel demand.
- MaaS growth brings opportunities but also threats towards transport operators who will have to adapt their business models and supply their transport capacity directly to MaaS providers, rather than customers.
- Transport authorities can access rich data regarding transport habits, thus helping them optimise transport systems management and networks.

Indeed, according to surveys conducted among Whim users, for example, it seems that MaaS Whim operation in Helsinki has had an impact in the modal shift to PT, whereas the previous private car usage has been replaced by carsharing, car rental and taxi use, whilst cycling was also increased (see more in section 6.5).

However, it should be underlined that in many published outcomes, data providing some evidence for the impact of MaaS schemes is based on hypotheses and projections and are in many cases based on subjective surveys. For a realistic and more valuable insight, there should be a systematic objective recording of travel behaviour over a number of years followed by a careful factor analysis that would define the participation of MaaS solutions in this change, as the transport context is a dynamically changing one influenced by a variety of environmental factors that are usually associated to each other in a rather complex way. One should be careful, though, associating any modal shift or other change in travel behaviour change to a single factor (i.e. MaaS).

10.2 Key Performance Indicators (KPIs)

One of the goals of WP1 of MyCorridor has been to come up with a first extensive list of Key Performance Indicators (KPIs). KPIs are a set of quantifiable values that demonstrate how effectively a company/institution/project is achieving key objectives. The initial pool of MyCorridor KPIs has been identified, using as a starting point the MASSiFiE project’s relevant work. The MASSiFiE KPI’s have been revised, utilising collectively the feedback from all different activities held in WP1 of the project, but, also, taking into account the initial targets of MyCorridor. The additions from MyCorridor are indicated in Italics in the following table.
Still, these KPIs are going to be revisited and stabilised in the context of A6.4: “Impact Assessment” where the impact assessment of the project will be carried out (and, in specific, in D6.3 impact assessment framework). Also, therein, specific target value ranges will be defined per each.

There were three impact areas that were determined in the MASSiFiE project [54] (environmental, economic and social impact areas).

According to ISO 14001:2004 [48], as noted by MASSiFiE, environmental impacts describe "any changes to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation’s environmental aspects". The term 'aspect' describes the element of an organisation's activities or products or services that can interact with the 'environment', i.e. the surrounding in which the organisation operates including air, water, land, natural resources, flora, fauna, humans as well as the interaction between these.

One way of defining economic impacts is in terms of "effects on the level of economic activity in a given area" [84]. These can include business output or sales volume, personal income, or jobs (ibid.). However, social impacts may include the valuation of changes in quality of life factors (such as health, safety, recreation, air or noise quality) which can be valued in economic terms.

Social impacts have been defined as the effects which characterise and influence the community's social and economic wellbeing [54]. Another and more recent definition suggests that social impacts refer to changes that "...(might) positively or negatively influence the preferences, well-being, behaviour or perception of individuals, groups, social categories and society in general (in the future)" [22]. Social impacts can be derived from the provision of transport (e.g. infrastructure, vehicles, facilities, etc.) and from user experience (e.g. the experience of travelling) [60].

On top of that, MASSiFiE has discerned the impacts and their KPI’s on Individual/user level, Business/organisational level and Societal level. This pattern recommended by MASSiFiE has been currently preserved in order to allow cross-comparison for now, though it may be revisited/ extended in the context of MyCorridor to accommodate the specific research needs of the project.

The following table, except for providing a first pool of applicable KPI’s for impact assessment, serves as a "pre-impact" assessment of MaaS and MyCorridor as well (as it is itself operating in the MaaS domain), as MASSiFiE, on the basis of some first empirical results of MaaS schemes, and, also, through literature studies and assumptions, has proceeded with some indications of the expected negative and/or positive impact of MaaS across the several aspects (it is reflected through the colour coding in the following table).

However, despite the indications on expected impacts discussed in the MASSiFiE project and the additional ones assumed for MyCorridor, in the MyCorridor project, a full impact assessment of the MyCorridor MaaS solution in specific will be performed in A6.4. This will be fed by the pilot activities of the project; as such, it is important that the final list of KPI’s will be measured during them, aiming not only at a qualitative, but also, on a quantitative assessment of impacts of MyCorridor as much as possible.

It is crucial that reference data has to be collected in order to assess the “before” and “after” MyCorridor state. In this way, the following pre-impact assessment (that is based on MASSiFiE assessment on other MyCorridor like solutions and on assumptions made regarding additional MyCorridor impacts) will be validated across the following KPIs and the additional ones that will be recognised as the project evolves.
Finally, it should be stressed that despite the fact that MyCorridor is placed within the context of MaaS and an all in all comparable impact is expected on its behalf; as it is the case in all technological domains, it may result in different impacts than other similar schemes (of the past or the present), due to its differentiation points. In this respect, this is one of the most interesting aspects of research in the lifespan of the project.

| Table 15: KPIs per impact area for MaaS. |

<table>
<thead>
<tr>
<th>Overall positive increase/decrease</th>
<th>Both positive and negative increase/decrease</th>
<th>Overall negative increase/decrease</th>
<th>Not possible to assess</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Level</th>
<th>KPIs</th>
<th>Description</th>
<th>Environmental</th>
<th>Economic</th>
<th>Social</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual/user level</td>
<td>Number of multimodal trips</td>
<td>Another possible effect of the introduction of MaaS is that travellers will make use of different modes of transport as well as combine different modes of transport in a way that will</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Total number of trips made</td>
<td>Total number of trips made</td>
<td>A reduction in the total number of trips made could have a positive effect on congestion as well as emissions, and hence on the environment.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modal shift (from car to PT, to sharing, to...)</td>
<td>Modal shift (from car to PT, to sharing, to...)</td>
<td>The KPI refers to a modal shift from private car to other, more sustainable transport modes such as public transport, bicycling, walking, but also to car sharing and other sharing facilities. A general assumption is that the introduction of MaaS will result in a modal shift, from trips made by private cars to other modes of transport. This could have a positive effect on emissions and consequently also on the environment.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

*In the MyCorridor project however, it will be interesting to explore how this will work given that the specific solution is not excluding vehicle users (although it does promote vehicle sharing).*
<table>
<thead>
<tr>
<th>Level</th>
<th>KPIs</th>
<th>Description</th>
<th>Environmental</th>
<th>Economic</th>
<th>Social</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes towards PT, sharing, etc.</td>
<td></td>
<td>result in a more efficient use of available resources.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td><em>In specific, in MyCorridor, the aggregation of TM2.0 services will open up the multimodality to a greater group of travellers, as it will specifically address vehicle users.</em></td>
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<tr>
<td></td>
<td></td>
<td>MaaS could result in changed attitudes towards different modes of transport providing an increased use of different modes of transport. Indirectly a less positive attitude towards the use of private car use and a more positive attitude towards public transport, car- and bike sharing, etc. could result in environmental impacts.</td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td><em>Again, as mentioned above, in MyCorridor, it is one of the crucial things to see how the advanced traffic management services will impact the use of vehicle, private or shared.</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived accessibility to transport</td>
<td></td>
<td>MaaS has been argued to result in an increased accessibility to transport and as a consequence also an increased access to, for example social services. This would have positive social impacts.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Total travel cost per individual/ household</td>
<td></td>
<td>MaaS could potentially result in a decrease in the total travel costs per individual and/or household.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total travel time per individual</td>
<td></td>
<td>The total travel time is conceived as the summation of time consumed for the trip planning (that may be significant specifically in cross-border travels) and the time spent for the travel itself (including waiting)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Level</td>
<td>KPIs</td>
<td>Description</td>
<td>Environmental</td>
<td>Economic</td>
<td>Social</td>
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<tr>
<td></td>
<td></td>
<td>Times, intermodal time, congestion time, etc.). Through MyCorridor, both are expected to decrease, as the travellers will spend less time in retrieving the optimum for them travel options in advance and will not spend unnecessary time in searching before or on their trip. Also, vehicle users will benefit from advanced traffic management services that will also lead to less time in congestion, optimum routing, etc. This will most probably result in a reduction of environmental resources as well, whereas it is also correlated to decrease of travel costs most probably.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business/organisational level</td>
<td>Number of customers</td>
<td>Given a shift from private car to other modes of transport, including public transport, car sharing, taxi, etc., service providers could be expected to face an increase in the number of customers which could result in a positive economic impact.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business/organisational level</td>
<td>Customer segments (men/women, young/old, ...)</td>
<td>With a transport service offer that has a less narrow focus on a shift from private car to public transport specifically but instead from private car to other modes of transport, i.e. including different modes of transport in the service offer, it is possible that MaaS will attract new and other customer segments. This could be expected to result in an increase in the number of customers which could result in a positive economic impact. Especially MyCorridor, throughout is personalisation approach is expected to contribute significantly to that. MyCorridor aims to address specific traveller clusters (businessmen, commuters, mobility restricted users, elderly,</td>
<td></td>
<td>X</td>
<td>x</td>
</tr>
<tr>
<td>Level</td>
<td>KPIs</td>
<td>Description</td>
<td>Environmental</td>
<td>Economic</td>
<td>Social</td>
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<tr>
<td>Collaborative/partnership in value chain</td>
<td>etc. throughout an all inclusive approach</td>
<td>With the assumption that MaaS will require further collaboration between transport service providers, public as well as private, it is feasible to assume further collaboration between different stakeholders and (depending upon the business model) possibly new roles in the value chain. Especially in the case of MyCorridor, the value chain is opened up to more providers coming from the traffic management and navigation world (i.e. SWARCO MIZAR, TomTom).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revenues/turnover</td>
<td></td>
<td>Depending upon how the streams of customers move, revenues could increase or decrease. These moves (and resulting revenues) are also dependent on the payment model, e.g. pre-paid packages with or without credit rolled over, pay-as-you-go, minimum monthly subscription level, etc., and the relative prices of the modes</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Data sharing</td>
<td></td>
<td>A further implementation and dissemination of MaaS relies on the collection and processing of data from different service providers, and hence on data sharing. Data sharing is thus a prerequisite for and a feasible impact of MaaS.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Organisational changes, changes in responsiblities</td>
<td>With the assumption that MaaS will require further collaboration between transport service providers, public as well as private, it is feasible to assume that organisational changes will be one result of a further implementation of MaaS.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>KPIs</td>
<td>Description</td>
<td>Environmental</td>
<td>Economic</td>
<td>Social</td>
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</tr>
<tr>
<td>Contribution to standards and novel business models</td>
<td>MaaS is expected to bring in important changes in business models and roles, while it is not impossible that throughout the new paradigms, the need for new standards or revision of standards may emerge (i.e. regarding security and interoperability).</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>ICT and ITS penetration</td>
<td>Both ITS and ICT penetration will be affected by MaaS and will most probably increase giving a boost to the associated markets. However, it should be validated if impacts on social level will be positive or negative.</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Emissions</td>
<td>A reduction in emissions relies on a reduction in trips made and/or reduction in km travelled, and/or a modal shift from petrol/diesel fuelled car to other modes of transport. If MaaS results in a modal shift, from trips made by less energy using modes of transport, this could result in a reduction of emissions. If MaaS also results in a reduction in the overall number of trips made, a further positive effect on the emissions resulting from transport could be expected.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Societal level</td>
<td>Resource efficiency (roads, vehicles,)</td>
<td>Given a reduction in number of trips made, MaaS could possibly result in an increase in resource efficiency due to a reduction in</td>
<td>X</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>KPIs</td>
<td>Description</td>
<td>Environmental</td>
<td>Economic</td>
<td>Social</td>
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</tr>
<tr>
<td></td>
<td>Level KPIs</td>
<td>Description</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>land use, ...)</td>
<td>congestion. Given a reduction in the ownership and use of private cars, a reduction in the need for parking spaces can be expected. Furthermore, a further use of shared resources in terms of public transport, carsharing, and bikesharing, etc. results in an overall increase in resource efficiency.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Citizens accessibility to transport services and beyond</td>
<td>MaaS has been argued to result in an increased accessibility to transport and, provided this increased accessibility to transport, also to an increased accessibility to the different services offered by society.</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Citizens overall comfort &amp; well-being</td>
<td>MaaS and MyCorridor in specific is expected to increase comfort with respect to travelling, which is expected to be even more evident in cross-border travels. In MyCorridor, this will be specifically addressed through the personalisation aspects that will be put in force but will be also extended to vehicle users due to the fact that they will enjoy of advanced traffic management services that will promote multimodality themselves. Nevertheless, apart from that, comfort of travellers is one of the</td>
<td></td>
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<tr>
<td>Level</td>
<td>KPIs</td>
<td>Description</td>
<td>Environmental</td>
<td>Economic</td>
<td>Social</td>
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<tr>
<td></td>
<td><strong>Trustworthiness in transport</strong></td>
<td>The overall trustworthiness in transport may or may not increase due to MaaS (including MyCorridor) with possible financial implications. This is associated to the overall service experience of the users with MaaS, both travellers and participating providers/operators.</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td><strong>Security and safety of citizens</strong></td>
<td>Due to the single access notion of MaaS solutions, including MyCorridor, and the default way of operation, citizens’ security and safety is rather expected to increase as more attention is paid at the liability part of service provision. The historical records that will be kept will serve as an additional safety net for the users. However, if attention is not paid to data protection rules and security protocols for transactions (with the travellers and the service providers both), the outcome may be exactly the opposite.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Modification of vehicle fleet (electrification, automation)</strong></td>
<td>The introduction of MaaS has been argued to facilitate a further electrification of the vehicle fleet. Also automated vehicles are frequently mentioned in relation to MaaS.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Legal and policy modifications</strong></td>
<td>The implementation and dissemination of MaaS must take place taking national as well as international laws and regulations into considerations. Further implementation and dissemination of MaaS may require changes in laws and regulations and/or policy.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Employment indices</strong></td>
<td>Employment rates will be affected given a mass penetration of MaaS. MaaS may create the need for new positions and skills but may also</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
Apart from the above that refer to the overall impact of MyCorridor and MyCorridor like MaaS solutions, specifically in MyCorridor, a number of Quality of Service (QoS) indicators will be applied during the pilots in order to assess aspects related to the technical performance of the one-stop-shop as well as its acceptance and usefulness on behalf of all the types of users interacting with it. A first indication of the QoS indicators on technical performance is provided in the Use Case section below. Still, those are to be revisited in the context of A6.1: “Pilot plans and impact framework”.

The following table depicts the KPIs that current MaaS schemes seem to address (according to available and accessible knowledge for them):

<table>
<thead>
<tr>
<th>KPI impact area</th>
<th>UbiGo</th>
<th>Whim</th>
<th>SMILE</th>
<th>MyCicero</th>
<th>Hannovermobil</th>
<th>EMMA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Environmental</strong></td>
<td>X</td>
<td>Not known</td>
<td>X</td>
<td>Not known</td>
<td>Not known</td>
<td>Not known</td>
</tr>
<tr>
<td><strong>Economic</strong></td>
<td>X</td>
<td>Not known</td>
<td>X</td>
<td>Not known</td>
<td>X</td>
<td>Not known</td>
</tr>
<tr>
<td><strong>Social</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Not known</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

UbiGo has achieved important changes in modality as users report; an increase of 50% in tram/bus use was reported followed by a 48% reduction in the use of private cars. Moreover, 63% of users stated they perceive a reduced transportation expenditure. Finnish MaaS Whim [3] was declared the first MaaS on a global scale and a key contributor to new business models. They also achieve mobility targets by including cost effective taxi rides to remote location with no good transport network. More specifically, after the use of Whim, 74% of users reported to use public transport as opposed to 48% that used it before running Whim in Helsinki. Further to that, the use of private car fell from 40% to 20.

The Austrian app SMILE has reported changes in transportation choices and an increase in intermodality [28]. More specifically, 48% respondents increased usage of public transportation (urban PT 26%, regional PT 22%). As far as intermodality is concerned, 26% confirmed an increased use of public transport in combination with their private cars. 20% combined public transport and riding a bicycle more often. SMILE also achieved environmental targets; 48% of the respondents stated to use public transportation more often, 21% reduced the use of their private cars. EMMA was applied in Montpellier, France and the first results show it has achieved changes in mobility and acceptance’ there was an increase in public transport use (+4% in 2015) and in bike sharing (+1% in 2015) while 160,000 people downloaded the app on iOS and Android. No quantified results were found for MyCicero and Hannovermobil in relation to the KPI cluster determined in the table above.
11 User & Market driven requirements

This section summarises the requirements as identified through the consolidation of the collected information through a) the literature and the current MaaS landscape (competition), b) the online survey conducted by MyCorridor project, c) the focus groups and d) the feedback during and after the 1st Pan-European MyCorridor workshop. As such, the following table summarises the recognised requirements (and their respective originating source as aforementioned) and it identifies per each, if and to which degree it has been (or will be) taken into account by the Use Cases that are described in detail in section 12 but also by MyCorridor other activities. This list that serves as a Clearances list for the Use Cases and the project overall, will be revisited and turn to technical specifications in the context of WP2 work.

Table 17: Use Cases that tackle the identified requirements.

<table>
<thead>
<tr>
<th>Requirement – Checkpoint</th>
<th>Source (Document section)</th>
<th>Relevant stakeholder</th>
<th>Applicable UCs</th>
<th>Mandatory/ nice to have</th>
<th>Clearance</th>
<th>Justification</th>
<th>Further actions/ considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Both the UI and the Mobility Products provided would be pre-configured per category of traveller and according to the profile and travel preferences in order to enhance their experience. In addition, travellers should be able to further customise it. See section 7.2, as a starting point for default profiles per key traveller category.</td>
<td>Focus groups [7.3], SoA[6], Pan-European workshop (post feedback survey) [8.3], Online survey, Literature survey [7.2]</td>
<td>Travellers</td>
<td>T2, T3</td>
<td>Nice to have</td>
<td>Fully met</td>
<td>MyCorridor has anticipant a full Use Case for static and semi-dynamic profiling set-up (T2) that will allow the delivery of tailor-made product (T3). Still, the traveller will be always able to further customise the configured by the system options.</td>
<td>Further details are to be exploited when designing the personalisatio and UI features of the app in WP5.</td>
</tr>
<tr>
<td>2. Users should be able to enjoy configured Mobility Products by mode of transport, time, cost, comfort, CO₂ emissions, travel preferences (preferred transport modes, favourite POIs, transport schedules, etc.), mobility</td>
<td>SoA [6], Literature survey [7.2], Online survey results [7.4], Pan-European workshop (post feedback survey)</td>
<td>Travellers</td>
<td>T2, T3</td>
<td>Nice to have</td>
<td>Fully met</td>
<td>As above. All configuration criteria mentioned are tackled in T2 (and T3).</td>
<td>As above. Due to some slightly contradicting views on which criteria should be configurable, to be on the safe side, all will be optional in the</td>
</tr>
<tr>
<td>#</td>
<td>Requirement – Checkpoint</td>
<td>Source (Document section)</td>
<td>Relevant stakeholder</td>
<td>Applicable UCs</td>
<td>Mandatory/ nice to have</td>
<td>Clearance</td>
<td>Justification</td>
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<tr>
<td>3.</td>
<td>Users need to be able to completely <strong>delete their profile, preferences and data</strong> from MyCorridor platform.</td>
<td>SoA [6]</td>
<td>Travellers</td>
<td>T2</td>
<td>Mandatory</td>
<td>Fully met</td>
<td>Tacked in interaction of T2.</td>
</tr>
<tr>
<td>4.</td>
<td>The platform should not push information that is irrelevant to traveller habits, preferences, etc. Added value services should be clearly aligned with denoted preferences and geolocalisation.</td>
<td>Focus groups [7.3]</td>
<td>Travellers</td>
<td>T2, T3, T4</td>
<td>Mandatory</td>
<td>Fully met</td>
<td>The personalisation part of the one-stop-shop aims to tackle exactly that aspect; all services, added value or not will be pre-configured (if the travellers wishes) according to the denoted criteria.</td>
</tr>
<tr>
<td>5.</td>
<td><strong>Hobbies, interests, age and gender</strong> should be optionally requested.</td>
<td>On-line survey results [7.4]</td>
<td>Traveller</td>
<td>T2, T3, T4</td>
<td>Nice-to-have</td>
<td>Fully met</td>
<td>Part of the profiling process in T2 to delivery tailor-made products in T3 and through push notification in T4.</td>
</tr>
<tr>
<td>6.</td>
<td>The application should be <strong>mobile friendly</strong> to ensure users have easy access through their mobile and tablet devices.</td>
<td>SoA [6], Focus groups [7.3]</td>
<td>Travellers (especially Medium IT literacy ones)</td>
<td>N/A</td>
<td>Mandatory</td>
<td>Fully met</td>
<td>MyCorridor will be offered to the travellers through mobile applications in iOS and Android (as reflected in the project UCs).</td>
</tr>
<tr>
<td>7.</td>
<td>The application should have a <strong>user</strong></td>
<td>Focus groups</td>
<td>Travellers</td>
<td>Addressing all</td>
<td>Mandatory</td>
<td>To be met</td>
<td>This is the overall goal</td>
</tr>
<tr>
<td>#</td>
<td>Requirement – Checkpoint</td>
<td>Source (Document section)</td>
<td>Relevant stakeholder</td>
<td>Applicable UCs</td>
<td>Mandatory/nice to have</td>
<td>Clear ance</td>
<td>Justification</td>
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<tr>
<td>8</td>
<td>The UI is essential to comply with W3C WAI-AA guidelines as a minimum to allow people with disabilities to interact with the one-stop-shop. Specifically for travellers with cognitive disabilities, push services should be minimised and refer to explicitly denoted needs. Overall, the platform should have an intuitive, self-guiding and self-explaining interface without confusing side information.</td>
<td>Focus groups [7.3]</td>
<td>Travellers</td>
<td>Addressing all Traveller UCs</td>
<td>Mandatory</td>
<td>To be met</td>
<td>As above.</td>
</tr>
<tr>
<td>9</td>
<td>The platform should be available to a variety of languages and preferred language of interaction would be also taken into account.</td>
<td>Focus groups [7.3], On-line survey results [7.4]</td>
<td>Travellers</td>
<td>T2</td>
<td>Nice to have</td>
<td>To be explored</td>
<td>Preferred language of interaction taken into account in T2 profiling UC.</td>
</tr>
<tr>
<td>10</td>
<td>The interface should provide the option of “back” buttons to help guide users back when they are confused or change their mind.</td>
<td>Focus groups [7.3]</td>
<td>Travellers</td>
<td>Addressing all Traveller UCs</td>
<td>Nice to have</td>
<td>To be met</td>
<td>Key navigation principles will be applied in UIs of mobile apps to be developed.</td>
</tr>
<tr>
<td>11</td>
<td>In local trips, the most important criteria for travellers are reliability of</td>
<td>On-line survey results [7.4], Pan-European</td>
<td>Travellers</td>
<td>T2</td>
<td>Nice to have</td>
<td>Fully met</td>
<td>Part of profiling of T2.</td>
</tr>
<tr>
<td>#</td>
<td>Requirement – Checkpoint</td>
<td>Source (Document section)</td>
<td>Relevant stakeholder</td>
<td>Applicable UCs</td>
<td>Mandatory/ nice to have</td>
<td>Clear ance</td>
<td>Justification</td>
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<tr>
<td></td>
<td>services and time.</td>
<td>workshop [8.3]</td>
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</tr>
<tr>
<td>12</td>
<td>In cross-border trips, the most important criteria for travellers are reliability of services and cost.</td>
<td>On-line survey results [7.4], Pan-European workshop [8.3]</td>
<td>Travellers T2</td>
<td>Nice to have</td>
<td>Fully met</td>
<td>Part of profiling of T2. To be implemented in WP5.</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Priority profiles that should be supported (pre-configured) as a minimum by the platform are namely: daily commuter, tourist, businessman, spontaneous user. Still, travellers should be able to easily shift from one profile to another or to further customise the default options provided by the system.</td>
<td>On-line survey results [7.4], Pan-European workshop [8.3]</td>
<td>Travellers T2</td>
<td>Mandatory</td>
<td>Fully met</td>
<td>Part of profiling of T2. Default but further customisable profiling will be provided for those profiles as a minimum. To be implemented in WP5.</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Travelers should benefit from reliable information provided by the transport service providers and, consequently, the MaaS operator. In specific, the platform should provide up-to-date schedules, fares, real-time information, modifications, cancelations etc. from transport providers.</td>
<td>Focus groups [7.3], on-line survey results [7.4], SoA [6], Literature survey [7.2]</td>
<td>Service Providers (transport, infomobility, etc), MaaS aggregator, Travellers</td>
<td>Service Provider’s UCs &amp; B1-B2</td>
<td>Mandatory</td>
<td>To be fully met</td>
<td>MyCorridor has anticipated and will establish those mechanisms (technical, business) to make this a reality. Implementati on in WP3 &amp; WP4. Still, this is heavily dependent on the reliability of the original services provided. Liability (on the side of service operators vs the aggregator) is an objective of the SLA’s to be signed.</td>
</tr>
<tr>
<td>15</td>
<td>The platform should provide information about added value services based on user profile, preferences, habits,</td>
<td>Focus groups [7.3]; Literature survey [7.2]</td>
<td>MaaS aggregator, Travellers</td>
<td>T4</td>
<td>Nice to have</td>
<td>Fully met</td>
<td>Push information from added value services fed by profiling is</td>
</tr>
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<td>#</td>
<td>Requirement – Checkpoint</td>
<td>Source (Document section)</td>
<td>Relevant stakeholder</td>
<td>Applicable UCs</td>
<td>Manda tory/ nice to have</td>
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<td></td>
<td>etc. to enhance the overall user experience. Those should take specifically into account the preferences denoted by mobility-restricted users.</td>
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<td>tacked within T4.</td>
</tr>
<tr>
<td></td>
<td>The platform should provide travellers with the option to select from Mobility Products that are readily available.</td>
<td>Focus groups [7.3]</td>
<td>MaaS aggregator, Service Providers, Travellers (special focus to Businessman, leisure)</td>
<td>T3, S1-S3</td>
<td>Mandatory</td>
<td>To be anticipated.</td>
<td>It is in the primary goals of the project; still, it is heavily dependent on the original services to be aggregated.</td>
</tr>
<tr>
<td></td>
<td>The platform would provide traffic management services and cross border services.</td>
<td>SoA [6], online survey results [7.4], Pan-European workshop [8.3], Focus groups [7.3]</td>
<td>Travellers, MaaS operator, Service Providers (including Transport Service Providers)</td>
<td>T3</td>
<td>Mandatory</td>
<td>Fully met</td>
<td>Evident through the T3 cross-border trip planning. Also, redemption of traffic management services has been anticipated. A number of services to be aggregated are working on cross-border level or are complementing each other cross-border (see more in services inventory – Annex 6). A specific Activity is dedicated to services integration at and across sites (A4.5).</td>
</tr>
<tr>
<td>#</td>
<td>Requirement – Checkpoint</td>
<td>Source (Document section)</td>
<td>Relevant stakeholder</td>
<td>Applicable UCs</td>
<td>Mandatory/nice to have</td>
<td>Clearance</td>
<td>Justification</td>
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<tr>
<td>18</td>
<td>MaaS Products/services should not raise the cost and be inclusive as much as possible.</td>
<td>Focus groups [7.3]</td>
<td>MaaS aggregator,</td>
<td>T2</td>
<td>Mandatory</td>
<td>Fully (to) be met</td>
<td>Default profiling upon a series of profiles including mobility restricted users will enable this. A specific task (A7.2) is dedicated to pricing policy and the corresponding B2B agreements.</td>
</tr>
<tr>
<td>19</td>
<td>The one-stop-shop should consider addressing multiple needs, reflecting not only mobility specific needs but QoL daily needs of travellers.</td>
<td>Focus groups [7.3]</td>
<td>MaaS Operator,</td>
<td>T2, T4, B2</td>
<td>Nice to have</td>
<td>Fully met</td>
<td>The Use Cases dealing with provision of push notification as well as synthetic services according to profiling have been anticipated to ensure this.</td>
</tr>
<tr>
<td>20</td>
<td>The platform would be nice to provide precise and real-time information about mobility restrictions (real-time) and weather conditions so that senior citizens avoid making journeys in bad weather.</td>
<td>Focus groups [7.3]</td>
<td>Mobility restricted</td>
<td>T4</td>
<td>Nice to have</td>
<td>To be explored</td>
<td>This is part of the personalised push information but is dependent on the availability of relevant services.</td>
</tr>
<tr>
<td>21</td>
<td>To provide the travellers with significant number of options available with regard to Mobility Products they are interested in.</td>
<td>Pan-European workshop (post feedback survey) [8.3]</td>
<td>Maas Aggregator</td>
<td>T3</td>
<td>Nice to have</td>
<td>To be explored</td>
<td>The one-stop-shop originally supports that. However, the actual number of available options depends on</td>
</tr>
<tr>
<td>#</td>
<td>Requirement – Checkpoint</td>
<td>Source (Document section)</td>
<td>Relevant stakeholder</td>
<td>Applicable UCs</td>
<td>Mandatory/ Nice to have</td>
<td>Clearance</td>
<td>Justification</td>
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<tr>
<td>22</td>
<td>The platform must provide a single account log-in for the one-stop-shop through which they can log-in, search, configure, book and pay for all MaaS products and issue vouchers for all transport modes, so as to ensure a seamless experience.</td>
<td>Literature surveys [7.2, 7.2], Focus groups [7.3], Online survey results [7.4], Pan-European workshop (post feedback survey) [8.3], SoA [6]</td>
<td>MaaS aggregator</td>
<td>All Traveller Use Cases</td>
<td>Mandatory</td>
<td>Fully met</td>
<td>All denoted functions are reflected in the workflows of Traveller Use Cases.</td>
</tr>
<tr>
<td>23</td>
<td>The system must ensure a secure payment environment for cashless transactions with travellers and service providers.</td>
<td>SoA [6], Online survey results [7.4], Literature survey results [7.2]</td>
<td>MaaS aggregator, Payment Facility</td>
<td>B3</td>
<td>Mandatory</td>
<td>Fully met</td>
<td>Clearance will be executed by a certified entity (VivaWallet) in compliance with all relevant standards</td>
</tr>
<tr>
<td>24</td>
<td>Users should be able to track their trips and expenses, check their balance, earn bonus points and review their trip history on their account.</td>
<td>SoA [6], Online survey results [7.4], Pan-European workshop (post feedback survey) [8.3], Literature survey results [7.2]</td>
<td>MaaS Aggregator, Travellers</td>
<td>T3, T7</td>
<td>Mandatory</td>
<td>Fully met</td>
<td>Addressed in T3 and T7 workflows.</td>
</tr>
<tr>
<td>25</td>
<td>The eligibility characteristics of vouchers must be presented to the user.</td>
<td>Focus groups [7.3], Pan-European workshop (post feedback)</td>
<td>MaaS Aggregator, Payment Facility, Travellers</td>
<td>T3, B3, B4</td>
<td>Mandatory</td>
<td>Fully met</td>
<td>Both the e-vouchers and the Mobility Tokens are characterised across a series of</td>
</tr>
<tr>
<td>#</td>
<td>Requirement – Checkpoint</td>
<td>Source (Documen t section)</td>
<td>Relevant stakehold er</td>
<td>Applicable UCs</td>
<td>Manda tory/nice to have</td>
<td>Clear ance</td>
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</tr>
<tr>
<td>26</td>
<td>Users should be provided with the option to select between a monthly subscription or a pay-as-you-go one. Users can access their transaction history through the platform at any given time.</td>
<td>SoA [6], Focus groups [7.3], on-line survey results [7.4], Pan-European workshop (post-feedback survey) [8.3]</td>
<td>MaaS Aggregato r, Payment Facility, Travellers</td>
<td>T2, T3, B3</td>
<td>Nice to have</td>
<td>To be explored</td>
<td>Depends on the Business Model to be applied.</td>
</tr>
<tr>
<td>27</td>
<td>Users should be able to access feedback and reviews from other users regarding the services. Also, users should be given the option to input their own feedback after using a service.</td>
<td>On-line survey results [7.4], Pan-European workshop [8.3]</td>
<td>MaaS Operator, Travellers</td>
<td>T6</td>
<td>Nice-to-have</td>
<td>Fully met</td>
<td>All tackled in the workflow of T6.</td>
</tr>
<tr>
<td>28</td>
<td>The platform operation should comply with Security Data Privacy and GDPR regulations – with respective acknowledgement to the traveller - in order to ensure user privacy and security of information.</td>
<td>SoA [6], On-line survey results [7.4], Pan-European workshop (post-feedback survey) [8.3], Focus groups [7.3], Literature survey [7.2]</td>
<td>MaaS aggregato r Addressing the back-end UCs</td>
<td>Manda tory</td>
<td>To be met</td>
<td>Will be ensured in the back-end mechanisms of the one-stop-shop.</td>
<td>To be also reflected in T2 profiling.</td>
</tr>
<tr>
<td>29</td>
<td>Incentives should be applied in a way so as to provide motives that are not related only to monetary benefits but also to environmental benefits, being acceptable in terms of personal safety, cost, and flexibility,</td>
<td>Focus groups [7.3]</td>
<td>MaaS operator</td>
<td>To be reflected in T3 and worked out in T7 and B1</td>
<td>Nice to have</td>
<td>To be met</td>
<td>Depending on the business modelling output regarding incentivisatio n to be applied in WP7.</td>
</tr>
<tr>
<td>#</td>
<td>Requirement – Checkpoint</td>
<td>Source (Documten t section)</td>
<td>Relevant stakeholder</td>
<td>Applicable UCs</td>
<td>Mandatory/ nice to have</td>
<td>Clear ance</td>
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<td>as the users themselves would not opt for them by themselves.</td>
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<tr>
<td>30</td>
<td>MaaS systems need to find ways of incorporating local variability across the cross-border corridor.</td>
<td>Focus groups [7.3]</td>
<td>MaaS operator, Travellers</td>
<td>To be reflected in T3.</td>
<td>Mandatory</td>
<td>To be met</td>
<td>Will be met to the degree it is supported by the detail of the services to be aggregated.</td>
</tr>
<tr>
<td>31</td>
<td>All necessary steps and standards should be applied so as to offer interoperable services with access from anywhere in the EU.</td>
<td>Focus groups [7.3]</td>
<td>MaaS operator, Service Providers</td>
<td>All Use Cases.</td>
<td>Mandatory</td>
<td>To be met</td>
<td>A specific task (A2.3) deals with the interoperability aspects in MyCorridor.</td>
</tr>
<tr>
<td>32</td>
<td>Overall service reliability – Service should be always available when users want to use it.</td>
<td>On-line survey results [7.4], Pan-European workshop [8.3]</td>
<td>Travellers, MaaS operator and service provider s UCs</td>
<td>Mandatory</td>
<td>To be fully met</td>
<td>It is upon the responsibility of the MaaS aggregator.</td>
<td>Depending on the network.</td>
</tr>
<tr>
<td>33</td>
<td>There should be transparent, viable and beneficial Service Level Agreements (SLAs).</td>
<td>SoA [6]</td>
<td>MaaS aggregator, Service providers</td>
<td>S3, B1</td>
<td>Mandatory</td>
<td>To be met</td>
<td>B2B relations between the aggregator and the service providers.</td>
</tr>
<tr>
<td>34</td>
<td>The platform should have a user-friendly API to allow 3rd parties (TSPs) to input their content. The technological platform should be regularly maintained.</td>
<td>SoA [6], Pan-European workshop (post-feedback survey) [8.3] On-line survey results [7.4], (travellers’ concern), Literature [7.2]</td>
<td>MaaS Provider and Transport provider</td>
<td>S1-S3</td>
<td>Mandatory</td>
<td>Fully met</td>
<td>To be achieved through the Service Registration Tool and the Business Rules editor of the one-stop-shop, as reflected in the corresponding Use Cases.</td>
</tr>
<tr>
<td>35</td>
<td>To determine the revenue model and</td>
<td>Focus groups</td>
<td>MaaS aggregator</td>
<td>S3, B1</td>
<td>Mandatory</td>
<td>To be explo</td>
<td>It is part of the</td>
</tr>
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<td>#</td>
<td>Requirement – Checkpoint</td>
<td>Source (Document section)</td>
<td>Relevant stakeholder</td>
<td>Applicable UCs</td>
<td>Mandatory/nice to have</td>
<td>Clear</td>
<td>Justification</td>
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<tr>
<td>36</td>
<td>To stimulate MaaS business success, <strong>scaling discounts, promotion strategies</strong> and loyalty schemes are necessary.</td>
<td>[7.3], Literature surveys [7.2; 7.2]</td>
<td>Traversers, Service Providers</td>
<td>T7, reflected in T3.</td>
<td>Mandatory</td>
<td>To be explored</td>
<td>Indicative strategies will be applied for evaluation in WP6 pilots.</td>
</tr>
<tr>
<td>37</td>
<td>To encourage more environmentally friendly mobility habits, the top three strategies to apply are <strong>scaling discounts</strong>, comparing environmental benefits because of modal shifts and tax reductions.</td>
<td>Pan European workshop (post-feedback survey) [8.3]</td>
<td>MaaS aggregator, Traversers, Service Providers</td>
<td>T7, reflected in T3.</td>
<td>Mandatory</td>
<td>To be explored</td>
<td>Indicative strategies will be applied for evaluation in WP6 pilots.</td>
</tr>
<tr>
<td>38</td>
<td>Key incentives to be applied to attract service providers are: <strong>increase in revenues, ease to join</strong> and security &amp; data protection for own users.</td>
<td>Pan-European workshop (post-feedback survey) [8.3]</td>
<td>MaaS aggregator, Service Providers</td>
<td>S3, B1</td>
<td>Mandatory</td>
<td>To be explored</td>
<td>B2B relations, part of the commercialisation of the system.</td>
</tr>
</tbody>
</table>

Apart from the above requirements, specifically the prioritisation of the Use Cases as it has been done by the experts participating in the workshop has been taken into account (Table 9) for the final prioritisation and is specifically discussed in the following chapter per Use Case.
12 Use Cases & scenarios

12.1 Introduction

When starting a system development project, the system to be developed is the putative solution to some problem in the user's environment (the "application domain"). Naturally, the problem-solving method is composed of the following steps:
1. Study the problem until we are confident that we understand it.
2. Describe a proposed solution for the problem (e.g. a requirements specification document for a computer system).
3. Implement the solution (i.e. build the system).

A Use Case, as a description of an actor's interaction with the system to be developed is both a description of the system's user interface and an indirect description of some function that the system will provide. In short, as descriptions of the new system, Use Cases belong in step 2 above, describing the proposed solution to the problem. So the development of Use Cases (UCs) has a place in the problem solving process, but this place is not as the first step, and it is not as the only step. Thus, although UCs constitute an essential work towards the innovative MyCorridor system development, other factors contribute also to the system success.

The first activity in the requirements-gathering process must be the study and description of the problem-environment, the application domain. In fact, the initial step is the studying and understanding of the system to be developed, and not to jump right in and start proposing a solution. Thus, the MyCorridor Partners that lead the development of a specific module/system/function/service of the integrated one-stop-service proposed the appropriate UCs relevant to their module/system/function/service. However, these were correlated and actually filtered according to the stakeholder needs activities findings of the project, to verify them and furthermore, define their content, characteristics and priorities.

What is meant by the term “use case”? Different definitions are presented below, that help understand the need of developing Use Cases, as a requirements-gathering tool, prior to the development of any tool or system.
- Use Cases can be defined as what happens when actors interact with the system. By recording all the ways the system is used (use cases) we accumulate the requirements of the system. Therefore, a Use Case is a collection of possible sequences of interactions (scenarios) between the system under discussion and its users (or actors), relating to a particular goal [27].
- A Use Case is a description of a system's behaviour, written from the point of view of the user, who has instructed the system to do something particular. A Use Case captures the visible sequence of events that a system goes through in response to a single stimulus. This also means that Use Cases only describe the components the user can interact with, not the hidden mechanisms of the system [61].
- A Use Case, as a description of an actor's interaction with the system under development, is both a description of the system's user interface and a high-level description of the functions that the system will provide. A set of Use Cases is a description of the system to be designed, the solution to the problem [33].
- A Use Case is a description of sequences of events, that, when combined, lead to a system producing a useful result [31].
• A Use Case is a description of sequences of events, that, taken together, lead to a system doing something useful." [5].

When defining Use Cases, an important thing to know is to distinguish them from methodology. In fact, it is a powerful description to preview and analyse the functionality of a system. It is essential to capture the interaction between the user and the system being developed. In addition, Use Cases can be an effective tool, if they are developed in a disciplined (systematic) and coherent manner, as part of a methodology that first creates a well-defined domain-model. Thus, Use Cases can be useful when used properly.

Another aspect to consider is that Use Cases can be used during many stages of system development, being associated with different objectives. Used at the analysis stage, Use Cases can prevent the occurrence of costly error correction at later stages of the development cycle. At this initial phase of MyCorridor development, Use Cases will regard the objective of capturing the system requirements. Use Cases are not object-oriented, they are a broadly applicable requirements analysis tool that can be applied to non-object-oriented projects; a fact that increases their usefulness as a requirements method [74]; the definition of Use Cases actually resembles the process of functional decomposition and identifies various behavioural aspects. Use Cases are generated using a goal-oriented methodology: examining all the actors’ goals that the system satisfies yields the functional requirements.

Finally, Use Cases are goals that are made up of scenarios. Scenarios do not just refer to what the system can do, but also to those interactions that the system must be able to identify as invalid (e.g., error conditions and exceptions). Scenarios consist of a sequence of steps towards achieving the goal, which define the interaction level between the user and the system; each step in a scenario is a sub-goal of the use case. As such, each sub-goal represents an autonomous action that is at the lowest level stemming from the use case decomposition. This hierarchical relationship is needed to properly model the requirements of a system being developed. In addition, it helps avoid the explosion of scenarios that would occur, if we were to try to simply list all possible ways of interacting with the system.

12.2 Overview of Use Cases

The MyCorridor Use Cases and scenarios aim to reflect the key functions of the one-stop-shop that will be developed in the project. They aim to provide, in a summative way, the conceptualisation of the system and serve as the basis for the specification and development activities that will follow in WP2 and WP3 of the project respectively. Moreover, the Use Cases will constitute the baseline upon which the pilot scenarios of WP6 will be constructed.

The description of the Use Cases is provided in the following sections. The Use Cases have been derived as an aggregated outcome of the user-centric approach followed in WP1 of the project, the outcomes of which have been provided in all the previous sections of this Deliverable. Any revisions of the Use Cases that may emerge both during the specifications and development work of the project and the pilot iterations will be updated in the Use Cases Guide that will be published separately – as an individual document – in the project, as defined in A9.2.

A specific common template has been used for the description of the Use Cases (Annex 7). As soon as the Use Cases description was completed, in addition to these textual descriptions, and in order to allow their easy digestion by the development teams in the future phases of the project, UML (Unified Modeling Language™) diagrams have been prepared for each of them, showing the relationships among actors, sub-modules and activities/actions identified within each Use Case (see Annex 5). The tool selected for the development of UML diagrams of MyCorridor Use Cases have been is the Visio 2010 tool
[38]. More detailed sequence diagrams (that will be based on them) will be included in the System Architecture Deliverable (D2.2).

The overview of the finally formulated MyCorridor Use Cases follows below:

**Traveller Use Cases**

**T1 - User Login/Register/ Authentication**
- T1.1 - New/unregistered traveller
- T1.2 - Registered traveller
- T1.3 - Failed registration
- T1.4 - Failed Login/Authentication
- T1.5 - Login of unregistered user

**T2 - Static & semi-dynamic profiling**
- T2.1 - New/unregistered user creating profile
- T2.2 - Registered user

**T3 - Personalised MaaS package configuration, purchase & redemption**
- T3.1 – Configuration, purchase & redemption of personalised MaaS package (consisting of one or more mobility products) coupled with trip planning
- T3.2 - Configuration, purchase & redemption of personalised MaaS package with multicriteria search (without encompassing trip planning)
- T3.3 – Configuration, purchase and redemption of ready to use MaaS packages

**T4 - Personalised Info support (added value services – athletic, touristic, cultural, health push personalised notifications)**
- T4.1 – Configuration, purchase & redemption of personalised MaaS package (consisting of one or more mobility products) coupled with trip planning and *personalised push notifications*.
- T4.2 – Configuration, purchase & redemption of personalised MaaS package with multicriteria search (without encompassing trip planning) *coupled with personalised push notifications*.

**T5 - Modification/Cancelation**
- T5.1 - Modify selected mobility products
- T5.2 - Cancel the selection of all mobility products

**T6 - Traveller feedback**
- T6.1 - View information of other travellers
- T6.2 - Provide feedback for other travellers
- T6.3 - Provide feedback for MaaS

**T7 - Loyalty scheme (encompassing incentivisation & rewarding)**

**Service Providers Use Cases**

**S1 - Service provider log-in**
- S1.1 - Registered service provider
- S1.2 - New/unregistered service provider

**S2 - Service registration**

**S3 - Service provider business rules editing**

**Back-end Use Cases**

**B1 - Overall Business Rules editing**

**B2 - Added value synthetic**

**B3 – Clearance with the traveller and the service providers (e-vouchers)**
- B3.1 - E-vouchers creation and issue
- B3.2 - E-money voucher cancellation

**B4 – Mobility Token Issue and redemption (use/validation)**
B5 – Interactive Traffic Management Plan

The overview of the Use Cases that have been presented and ranked by the experts participating in the Pan-European workshop slightly differs; still, the essential parts of all Use Cases presented to them have been maintained in the final MyCorridor Use Cases. For the sake of consistency and in order to avoid replications and be able to provide a solid basis for the system architecture and specifications to follow in WP2, some of them have been merged (titles have changed respectively). The key changes are as follows:

- All the traveller UCs have been maintained, though the overall sequence of the traveller interaction from the configuration phase to the redemption phase is presented in one core Use Case, namely: “Personalised MaaS package configuration, purchase & redemption”. This will make the UI work in WP5 easier later on.

- The previous matchmaking UCs have been either reflected – in terms of content – in the traveller UCs or clustered under the Back-end Use Cases. In addition, the previous “Provided services performance ranking” UC is merged under the “Traveller feedback” UC, as, in reality it is an inherent part of the latter.

- In general, the key concept is that all back-end operations that support the traveller UCs are being reflected in the Back-end Use Cases, including the Payment Facility UCs (clearance and issuance of Mobility Tokens). The Traveller and the Service Providers UCs have been maintained in a separate cluster of UCs, as they reflect the interaction of the two key categories of users of the one-stop-shop.

- The previous UC entitled “Back office synergies with participating Service Providers” is now an integrated part of the “Mobility Token Issue and redemption” UC.

- It has emerged the need to include a new and separate UC (B5 - Interactive Traffic Management Plan) to address the back-end operations that are occurring prior and for the redemption of traffic management services.

Following the above-mentioned changes, the prioritisation provided by the workshop experts has been taken into consideration for the final prioritisation of MyCorridor Use Cases, as it is explicitly shown and discussed on UC level below.

The provisional values of the QoS indicators that will define the successful operation of the overall one-stop-shop are provided below on the basis of SoA competitive applications. These will be revised during the specification phase of WP2, while their final values will be defined in the experimental plans of WP6, as they will constitute a clear validation objective.

### Table 18: QoS indicators and thresholds for the interaction of one-stop-shop with the travellers.

<table>
<thead>
<tr>
<th>QoS indicator</th>
<th>Target value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy/Reliability</td>
<td>90% (regarding the accuracy of the informatory part of the products the one-stop-shop will return upon user profiling)</td>
</tr>
<tr>
<td>Validity</td>
<td>80% (one-stop shop products comply with the overall business rules policy)</td>
</tr>
<tr>
<td>Timeliness</td>
<td>&lt;= 2s for each individual interaction between traveller and system</td>
</tr>
<tr>
<td>Relevance</td>
<td>95% (one-stop shop products configured relevance to the user)</td>
</tr>
</tbody>
</table>
### Table 19: QoS indicators and thresholds for the interaction of one-stop-shop with the service providers.

Definitions are proportional to the above ones for travellers.

<table>
<thead>
<tr>
<th>QoS indicator</th>
<th>Target value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completeness</td>
<td>90% (seamless experience when applicable, i.e. in trip planning)</td>
</tr>
<tr>
<td>Accessibility</td>
<td>100% (W3C compliant interfaces)</td>
</tr>
</tbody>
</table>

#### 12.3 MyCorridor Use Cases

##### 12.3.1 Traveller Use Cases

**12.3.1.1 T1 - User Login/Register/Authentication**

**Use Case functional description:** The traveller will be able to create an account as a first step and then log-in and authenticate as a registered user. In particular, a new user will be provided with the option to create an account by entering a username and a password. An already registered user will be offered the option to login by providing the right credentials. This User Register/Login/Authentication activity is the starting point of the user interaction with the system and the prerequisite step before the user will be able to set up his/her profile.

**Lead Partner responsible:** CERTH/ITI (regarding the backend)

**Other Partners involved:** UPAT and CERTH/HIT (regarding the frontend; user login/registration will be performed through the mobile apps)

**Relevant WP/Activity:** This Use Case will be implemented in the context of WP3/A3.1: “Service delivery platform” regarding the backend and in WP5/A5.2: “UCD UI design and development” & A5.4: “Development of mobile interfaces for all types of devices” regarding the frontend.

**Technologies used:**
- For the front-end part, Android (Java) and iOS (objective C) programming languages will be leveraged, according to the target platform.
- For the backend, a NoSQL database (MongoDB) will be used for storing the user details and the Python Eve REST API framework for the communication with the frontend.

**Prerequisites/Dependencies/Restrictions:** No other Use Case as a prerequisite since this is the first interaction step between the user and the system. However, the user should have a mobile device supporting Android or iOS and a network connection available.
Indicative interaction flow scenarios

T1.1 - New/unregistered traveller
Step 1: The new/unregistered traveller is provided with the option to create an account by entering a username and a password.
Step 2: Upon conclusion of the basic profile registration, the user confirms by submitting his/her registration details.
Step 3: The newly created user details are stored in the database.
Step 4: The system sends confirmation to the traveller.

T1.2 - Registered traveller
Step 1: An already registered traveller is provided with the option to access her/his account by entering her/his username and password.
Step 2: The system receives the credentials of the traveller and authenticates him/her.
Step 3: After the traveller is authenticated, s/he is able to access and view his/her profile.

T1.3 - Failed registration
Step 1: The new/unregistered traveller tries to create an account by entering a username that has already been reserved by another traveller.
Step 2: Registration will fail and an error message will appear to the traveller, indicating that the specific username is not available.
Step 3: The traveller will have to choose a different username and repeat the process.

T1.4 - Failed Login/Authentication
Step 1: The traveller tries to log-in by entering a wrong username or password.
Step 2: Authentication fails, the traveller cannot log-in to the system and an error message appears indicating that user credentials are wrong.
Step 3: The traveller will have to retry by logging in by providing the correct credentials.

T1.5 - Login of unregistered user
Step 1: The new/unregistered traveller is provided with the option to proceed to the MyCorridor service without having to be registered in the system. Also, the system informs him/her that by making this choice (not being registered) s/he accepts to use a reduced set of MyCorridor's services (e.g. no matchmaking).
Step 2: The unregistered user accepts this choice.
Step 3: The application requests from the unregistered user to provide access to the IMEI number of the device for personalization/identification reasons.
Step 4: The unregistered user accepts this request and is redirected to the initial screen of the application.

Connected Use Cases: This Use Case serves as a starting point for Use Case T2: Static profile set-up/edit.

Benefits for key actor: This UC corresponds to a standard process. The traveller will be able to create an account, authenticate him/herself and log in to the system in order to start interacting with it. After logging in, the traveller will be able to edit his/her profile in order to enjoy personalised services that fit their denoted needs and benefits. One additional benefit is that MyCorridor one-stop-shop will give the opportunity also to non-registered users to join the app; though with some restrictions (i.e. no personalisation).

Alternatives & extensions: An alternative flow can occur in the case where the traveller chooses to log-in using a different type of account (e.g. Google, Facebook). In that case, the traveller will not provide
credentials for his/her MyCorridor account. Instead, the traveller will have to provide the right credentials for the selected accounts.

Prioritisation & discussion:

<table>
<thead>
<tr>
<th>From Consortium point of view</th>
<th>From project stakeholders' needs phase</th>
<th>Final (aggregated) prioritisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ Essential □ Secondary</td>
<td>☒ Essential □ Secondary</td>
<td>☒ Essential □ Secondary</td>
</tr>
</tbody>
</table>

**Justification:** The specific Use Case is considered as Essential. The first case is that a traveller will first create an account and login to the system in order to set up his/her profile and get back as a result the most applicable personalised services available. The second case is that an unregistered user will get the application and experience a reduced set of services.

**Concerns & Risks:** The main concern here has to do with security issues. Traveller credentials and details must be kept secret and protected from malicious unauthorised access.

Starting point/background & Innovation in MyCorridor
CERTH/ITI, the main developer of this function, has considerable experience in setting up reliable user Login/Register/Authentication mechanisms. In particular, CERTH/ITI has developed similar mechanisms in the context of the H2020 European project SocialCar - Open social transport network for urban approach to carpooling ([http://socialcar-project.eu/](http://socialcar-project.eu/)) and the FP7 European project MOVESMART - Renewable Mobility Services in Smart Cities ([http://www.movesmartfp7.eu/](http://www.movesmartfp7.eu/)). On the other hand, CERTH/HIT & UPAT have extensive experience on the development of UIs for Android and iOS platforms (see more in T2). There is no innovation anticipated here; this is a typical interaction for all mainstream web/mobile apps.

12.3.1.2 T2 - Static & semi-dynamic profiling

**Use Case functional description:** The traveller will be able to set-up and edit his/her profile denoting among other their needs and preferences. User preferences consist of user information, user preferences, travel preferences, accessibility preferences and travel information. After successful registration in T1, where few (the absolutely necessary) fields are required to be completed by user, the latter is able to create her/his profile by filling in her/his preferences. S/he will be able to view the profile and edit it further via the mobile application. The static part of the profile will include user information and accessibility preferences, while the semi-dynamic part will include general user preferences and travel preferences and information. Static information can be changed only by the user whereas semi-dynamic information can be updated while the user interacts with the application (e.g., in the context of configuration, purchase and redemption of Mobility Products).

The one-stop-shop matchmaking module will utilise the input provided in order to come up with the proposed service composition and, utterly, deliver the personalised Mobility Products to the traveller.
The profiling parameters are illustrated in the following tables. The user will be able to run the application either by using an iOS or an Android OS smartphone device while the UI will provide a similar user experience in both cases.

**User information parameters**

Table 21: User information parameters (static).

<table>
<thead>
<tr>
<th>Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>user name</td>
<td></td>
</tr>
<tr>
<td>password</td>
<td>encrypted (To be decided by T1)</td>
</tr>
<tr>
<td>email</td>
<td>To be decided with T1</td>
</tr>
<tr>
<td>mobile telephone number</td>
<td>Optional</td>
</tr>
<tr>
<td>age range</td>
<td>Optional</td>
</tr>
<tr>
<td>gender</td>
<td>Optional</td>
</tr>
<tr>
<td>language preference</td>
<td>From list</td>
</tr>
<tr>
<td>payment method</td>
<td>As it will be defined in B3</td>
</tr>
<tr>
<td>card details (if a payment option)</td>
<td>To be agreed with T1. It may include the following:</td>
</tr>
<tr>
<td></td>
<td>• CreditCardType</td>
</tr>
<tr>
<td></td>
<td>• CreditCardNum</td>
</tr>
<tr>
<td></td>
<td>• CreditCardCvv</td>
</tr>
<tr>
<td></td>
<td>• CreditCardDate</td>
</tr>
<tr>
<td></td>
<td>• BankAccount</td>
</tr>
</tbody>
</table>

**User preferences**

All of the following fields are optional.

Table 22: User preferences (static).

<table>
<thead>
<tr>
<th>Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hobbies/Interests</td>
<td>Optional; covering cultural, sport, health, weather – depending on the types of relevant services that will be available in the one-stop-shop.</td>
</tr>
</tbody>
</table>

Given the user preferences, push notifications will be provided in the context of T4. At this point, it is important to note that push notification may be deactivated by default in certain user profiles.

**User travel preferences**

All following preferences are optional to denote.

Table 23: User travel preferences (semi-dynamic; they will be updated by the application according to the user's selections and use).

<table>
<thead>
<tr>
<th>Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>Acceptable cost levels (low, medium, premium)</td>
</tr>
<tr>
<td>Transportation modes/means:</td>
<td>Acceptable/preferred transportation means. <em>Maritime and Air</em> may be added.</td>
</tr>
<tr>
<td>Bus</td>
<td></td>
</tr>
<tr>
<td>Metro</td>
<td></td>
</tr>
<tr>
<td>Tram</td>
<td></td>
</tr>
<tr>
<td>Rail</td>
<td></td>
</tr>
<tr>
<td>Car</td>
<td></td>
</tr>
<tr>
<td>Taxi</td>
<td></td>
</tr>
<tr>
<td>Walking</td>
<td></td>
</tr>
<tr>
<td>Biking</td>
<td></td>
</tr>
</tbody>
</table>
Routing preferences:
- shortest
- nearest
- cheapest
- fewer interchanges (transfers)
- fastest
- travel

These will be taken into account for the trip planning matchmaking. In the future, tourist route planning (most picturesque/interesting route) or POI's related trip planning (museum, archeological sites, restaurants) might be explored.

Favourite POIs and transport schedules
Optional; provisional input; updated also in semi-dynamic part; see below.

Type of services in favour of user
Following the clusters of services of the current inventory in Annex 6 (or as it will be finalized in WP4). Those will be combined in matchmaking with the transportation means and the routing preferences above.

Accessibility information
Possibility to get accessibility information in selected trips, for travellers with mobility restrictions.

Comfort
E.g., business vs economy seats, minimum interchanges, minimum walking.

Environmental footprint
Several options (e.g., low, not interested, etc.) will be provided and promoted through incentives depending the business model and strategies applied by the aggregator.

Pet
Yes/No

Meal
Yes/No

Luggage
Yes/No

Access preferences

All of the following fields are optional.

Table 24: Accessibility preferences (static).

<table>
<thead>
<tr>
<th>Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility</td>
<td>A combination of open and closed fields will be used for denoting needs and preferences. Part of this input will be also taken into account for the UI adaptability.</td>
</tr>
<tr>
<td>Visual</td>
<td></td>
</tr>
<tr>
<td>Deaf</td>
<td></td>
</tr>
<tr>
<td>Cognitive</td>
<td></td>
</tr>
<tr>
<td>Senior</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>To be further defined by the user.</td>
</tr>
</tbody>
</table>

Semi-dynamic travel information
The user may denote that s/he wishes no history to be tracked.

Table 25: Travel information (semi-dynamic; they will be updated by the application to the back-end according to user’s selections).

<table>
<thead>
<tr>
<th>Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date time</td>
<td>in UTC</td>
</tr>
</tbody>
</table>
### Field | Comments
--- | ---
Origin | 
Destination | 
Transport means | Tracking of frequently used travel choices (regarding transport modes/means, type of services and combination with itineraries, POI's, etc.) in local and cross-border trips. 
History (classification in local and cross-border trips) | 

The profiling configuration will initially leverage several **key examples of basic pre-configured profiles**, representing the main user categories identified by MyCorridor (commuter, tourist, businessman, spontaneous, mobility-restricted, bleisure, medium IT literacy). A combination of the above may also be deployed. The characteristics of the above user categories will originate from the user and stakeholder needs (that will be further enriched and updated in the context of WP5). As previously mentioned, these will be further and fully customisable.

**Lead Partners responsible:** UPAT, CERTH/HIT

**Other Partners involved:** WINGS and other Partners involved in WP5. CERTH/ITI for the interaction with the back-end.

**Relevant WP/Activity:** WP5 (A5.1: “Profiling mechanism”, A5.2: “UCD UI design and development” & A5.3: “Personalisation and inclusiveness mechanism”)

**Technologies used:** Python 3.6, Python Eve, MongoDB, Web standards (HTML, CSS, JavaScript, etc.), Material design

**Prerequisites/Dependencies/Restrictions:** All traveller Use Cases relate to this Use Case, which is a crucial requirement for the matchmaking operations in the back-end. As a prerequisite, T1 has to be completed. A network connection and mobile devices with the apps downloaded are also required. More dependencies and restrictions are presented in the tables above. In the case of an un-registered user, this UC does not take place at all. It should be stressed that, as it is obvious, the supported level of personalisation strongly depends on the quantity of information provided while profiling the traveller. In addition, the semi-dynamic part based on the history of configurations/use is fed by the T3 respective steps.

**Indicative interaction flow scenarios:**

**T2.1 - New/unregistered user creating profile**
Step 1: After the new/unregistered user logs in the one-stop-shop app (UC T1), s/he is asked to set-up his/her profile.
Step 2: The system asks him/her to select one or more of the pre-defined user profiles (the profiles of daily commuter, tourist, businessman and spontaneous user will be provisionally pre-configured as a basis taking the parameters presented above into consideration).
Step 3: Upon user selection, the pre-configured parameters will appear to him/her and s/he is given the option to further configure them (please note that some of the parameters are optional).
Step 4: Upon conclusion of the profile walkthrough, the user confirms by submitting his/her selection.
Step 5: The system sends confirmation to the user.
Step 6: The traveller may view and edit further his/her profile and resubmit (this can be repeated as many times as the user wishes; also, this process encompasses the complete deletion and cancellation of the profile).
Step 7: The newly created profile is stored in the back-end.

T2.2 - Registered user
Step 1: The traveller logs-in (T1) and requests a Mobility Product, optionally encompassing trip planning (T3.1-T3.2).
Step 2: The matchmaking module combines the profile, preferences and traveller history (if any and to the level it has been denoted by the traveller to be recorded) together with the trip planning (origin - destination) request in T3.1 of the user selections in T3.2 and the Mobility Products/ services availability in the one-stop-shop in order to create and provide the traveller with the optimum personalised corresponding Mobility Product/service composition.
Step 3: The system asks for confirmation or further edit of the Mobility Products (see T3). If s/he wishes, s/he can go back to the initial settings to change the profile and denoted preferences and make a new request.

From this point onward, T3 continues normally and, as reflected therein, depending on whether the traveller has selected to save his/her past trips/mobility products or if s/he has given consent to the system tracking their use/redemption, the Historical part of its profile is continuously updated and is more intelligent.

In case there is a deviation/contradiction between the static and semi-dynamic part of the profile (i.e. when a traveller selects a trip which is the fastest and more expensive although he/she has set the cheapest option in his/her routing preferences), the route preferences will be updated after n selections of the route with route preferences different to the one declared by the user. The n selections will be the frequency of the selection and it will be defined during the development process. For demonstration purposes, n will be set equal to 3. The n value will further increment when the application will be released.

The update process will be completely transparent to the user.

Connected Use Cases: As in Prerequisites field. See also in the tables with the configuration parameters above.

Benefits for key actor: The traveller stores and edits personal information for future use. The MyCorridor platform/application uses this information to improve the user experience and provide custom services and UI’s.

Alternatives & extensions: Extensions may refer to further personalization criteria that may be added in the future, on the basis of the travellers’ feedback and the commercial deployment of the system.

Prioritisation & discussion:

<table>
<thead>
<tr>
<th>From Consortium point of view</th>
<th>From project stakeholders’ needs phase</th>
<th>Final (aggregated) prioritisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ Essential ☐ Secondary</td>
<td>☐ Essential ☒ Secondary</td>
<td>☒ Essential ☐ Secondary</td>
</tr>
</tbody>
</table>

Justification: It is one of the most essential and innovative functions of MyCorridor as it will set the basis for all the personalisation and custom features of the MyCorridor app

Justification: Prioritisation as emerging from Pan-European workshop outcomes (Table 9).

Though rated as Secondary by the workshop experts, it is one of the core outcomes of MyCorridor – WP5 is dedicated to that – as such, it is kept as Essential for both implementation and
From Consortium point of view | From project stakeholders' needs phase | Final (aggregated) prioritisation
---|---|---
and will allow it to be all-inclusive. | | validation.

**Concerns & Risks:** Completeness, validity of user name or email and password, reliability including privacy issues. T2 stores and manipulates user's sensitive and private data (e.g. mobility restrictions, email, password). We must carefully implement User Authentication and Authorization components (T1 UC) and pay attention to Terms & Conditions regarding private data that will be acknowledged to the travellers and will be also agreed with the service providers. MyCorridor should avoid keeping credit card numbers and other sensitive user details. For the non-necessary fields, all profiling should be optional.

MyCorridor shall carefully consider how this authentication process will work, to ensure that a thoroughly secure system is in place, so that individuals can use their MyCorridor account, knowing that their personal information is protected by MyCorridor in accordance with MyCorridor's privacy policy.

MyCorridor is aware that no data must be stored longer than necessary, in accordance with the GDPR and all applicable data protection laws and regulations. MyCorridor's privacy policy, which will be easily accessible in-app and via MyCorridor's website and transparent to individuals, will clearly set out the retention periods for the personal information that it holds on users.

Both MyCorridor's privacy policy and terms and conditions will clearly set out contact information for individuals in cases where they have any questions in relation to their personal data or the MyCorridor platform more generally.

**Starting point/background & Innovation in MyCorridor:** Taking into consideration each team's background, we come to the conclusion that both teams have extensive experience in user-profiling mechanisms. UPAT has gained practical knowledge on the latter by applying such mechanisms, in projects like Dicode (http://dicode-project.cti.gr) and Palette (http://palette.ercim.eu/). CERTH/HIT has gained relevant experience participating in various European research projects in the travelling and mobility area. For example, IM@GINE-IT (https://cordis.europa.eu/project/rcn/71146_en.html) focused on supporting intermodality and seamless travel using advanced positioning (GPS, A-GPS) and mapping technologies. ASK-IT (http://www.ask-it.org/) developed services for user with impairments, including maps, indoor and outdoor positioning, and trip planning considering user profile parameters. Another European research project, called OASIS (http://www.oasis-project.eu/) provided services for elderly containing map, PT transport and carpooling considering social media interaction between users. User can also report traffic issues. SocialCar finds transport alternatives increasing use of collective transport. MyCorridor provides MaaS including cross border trip interchanges encompassing geolocalisation and inclusiveness. As such, CERTH/HIT will collectively use all its previous know-how respectively.

12.3.1.3 **T3 - Personalised MaaS package configuration, purchase & redemption**

**Use Case functional description:** This UC is the one reflecting the core interaction of the traveller with the MyCorridor one-stop-shop, starting from the selection of Mobility Products (three main categories of them are anticipated) and concluding with their redemption at the operators/providers site. After user login and authentication and profile set-up, the user is finally provided with three options (reflected through three alternative interaction flows respectively) and s/he is guided to a different workflow depending the case. In the first 2 cases, s/he is provided with an initial package of Mobility Products that have been filtered through the matchmaking process in the back-end, receiving as input...
the traveller profile (in case the traveller is registered or when selection criteria are provided). In the third case, the traveller selects from existing MaaS packages that – depending on the case – are composed according to a key characteristic (i.e. similar services like vehicle sharing for all Europe, services more appropriate for one category of users, package of services per destination in Europe) valid for different periods of time and updated according to the changing business dynamics of the platform.

T3.1 – Configuration, purchase & redemption of personalised MaaS package (consisting of one or more mobility products) coupled with trip planning
Upon the availability of services in the one-stop-shop and the traveller profile and preferences, MyCorridor performs an ad-hoc matchmaking process providing the applicable Mobility Products for each leg of the trip planning of the user.

T3.2 - Configuration, purchase & redemption of personalised MaaS package with multicriteria search (without encompassing trip planning)
In this case, trip planning is not included. The user is able to select Mobility Products, either by an arbitrary value of a characteristic of the Mobility Products & Services or by selecting specific predefined values for different search criteria.

The same Use Case is also applicable for the MaaS aggregator and valuable for the management and governance of the one-stop-shop. This might also prove useful for the composition of the packages of the third case below.

T3.3 – Configuration, purchase and redemption of ready to use MaaS packages
In this case, there is no matchmaking taking place. The packages are composed by the MaaS aggregator and are updated on a frequent basis, as decided by the aggregator. The packages cannot be further configured by the traveller, as they are composed on the basis of specific offers (valid for a specific period of time). The B2 – Added value synthetic may provide valuable feedback in this case.

Lead Partner responsible: CERTH/ITI, CERTH/HIT, AMCO, VivaWallet, SWARCO

Other Partners involved: All service providers of the project; internal and external to be involved.

Relevant WP/Activity: All Activities of WP3 (except for A3.4: Traveller feedback integration module) are engaged for this Use Case.

Technologies used: The Java programming language will be used for the development of the matchmaking module. The corresponding Integrated Development Environment (IDE) will be Eclipse Oxygen. The services will be stored and delivered in JSON format. For the front-end part of the multicriteria search module, the JavaScript programming language will be used and in particular the jQuery and the Bootstrap libraries. For the back-end implementation the Python Eve REST API framework will be used. The traveller will interact through iOS and Android mobile apps.

Prerequisites/Dependencies/Restrictions: The T1 – User Login is a prerequisite for this Use Case to happen, whereas T2 – Static & semi-dynamic profiling is a prerequisite only in case the traveller is interested in getting personalised products. Undoubtedly, the number of services registered in the one-stop-shop plays a significant role for the overall user experience; as such, all the Service Providers Use Cases for a sufficient number of services have to be realised in advance. In addition, this Use Case sums up the traveller interaction perspective. The replication of this in the back-end of the one-stop-shop consists of all the Back-end Use Cases, meaning that all back-end mechanisms described therein have to take place in order to allow the progressive steps of the current Use Case happening.
In addition, the travellers should have a mobile device supporting Android or iOS and a network connection.

Finally, depending on the way the implementation will progress, the e-money voucher and the Mobility Token that are mentioned in the conclusion of the indicative workflows below (see more details in the Back-end Use Cases) may eventually come up to be one single element. Still, even in that case, there are two different functions corresponding to them (as also mentioned below). One is related to the payment receipt of the purchased MaaS packages and the other is related to the detailed coded list of Mobility Products that will enable their redemption.

Indicative interaction flow scenarios:

All of the following workflows start upon the completion of Use Cases T1 (and T2 – see above) and after the traveller has selected from a main menu which of the three types of products s/he is interested in.

T3.1 – Configuration, purchase & redemption of personalised MaaS package (consisting of one or more mobility products) coupled with trip planning

Step 1: The traveller starts by requesting a trip. In particular:

  Step 1.1: The traveller provides the origin and destination point, either by selecting them from a map or by filling an appropriate form.
  Step 1.2: The traveller provides the date and time of the trip either by selecting the appropriate values in a calendar or by filling an appropriate form.
  Step 1.3: The traveller selects preferable modes for the specific travel or types of services s/he prefers (see Annex 6 for the current Inventory of Services). This step is optional. If the user does not wish to denote preferable modes, the system will take into account the preferences recorded in his/her profile.
  Step 1.4: The traveller submits the request.

Step 2: The system receives the traveller’s trip request. As a first step, the MyCorridor trip-planning module searches the service repository for trip-planning services that operate in the geographical area of the origin and destination points, within the date and time of the requested trip. If there is any available service, it selects it. Otherwise, it selects the generic open trip-planning module implemented by the system.

Step 3: The selected trip-planning module generates the trip.

Step 4: The matchmaking module gets the travel preferences of the traveller from his/her profile.

Step 5: For each leg of the generated trip, the matchmaking module:

  Step 5.1: Gets the main characteristics of the leg, i.e. the origin point, the destination point and the time to complete.
  Step 5.2: Searches the service repository for Mobility Products/services that comply with the leg’s main characteristics and the traveller’s travel preferences (including the modes selected/edited by the user).
  Step 5.3: Creates and presents the traveller with a set of appropriate Mobility Products/services for the specific traveller for each leg of the trip.

Step 6: The traveller evaluates the set of Mobility Products/services for each leg of the trip and chooses those s/he prefers – connection to UC T6 – Traveller feedback (and T2 history).

Step 7: Upon confirmation of services for each leg of the trip from the traveller, the final synthesised MaaS package for the whole trip is presented to the user.

Step 8: The traveller has a last chance to edit its package before the final confirmation and checkout (connection to UC T5 – Modification/Cancelation).

Step 9: The traveller proceeds with the payment and denotes willingness to pay.

Step 10: The traveller selects method of payment and pays for the MaaS package confirmed.

Step 11: The system confirms payment and returns an e-money voucher (payment receipt) to the traveller as well as the consolidated Mobility Token that is ready for redemption/validation at the
operators/providers side. Depending on the selected mobility service providers, the passenger shall receive:

- a single QR code that can be used with all the selected service providers.
- multiple QR codes, where each of them corresponds to a service provider.
- a combination of QR code/username-password.

Step 12: The traveller saves the paid MaaS package for his/her trip (optional step) – feedback to T2.
Step 13: The paid trip is saved by the system in the Travellers Data Repository and specifically in the collection MyTrips.
Step 14: The traveller consumes progressively the (validated in Back-Office – see Use Case B4) Mobility Tokens at the operators (feedback to T2).

**Following steps for redemption of TM2.0 services**

A subgroup of the above flow concerns the case where one or more trip legs are related to car (private or sharing scheme) use. In that case, the travellers might wish to benefit from enhanced traffic management services (i.e. TM2.0) during driving (or being co-drivers). The overall workflow is similar. The only differentiation starts at the moment of the actual travel, where the Mobility Tokens are consumed (Step 14 onwards). In that case, the following steps are additionally required:

Step 15: The traveller enters the vehicle (private or shared) and before starting the engine, s/he activates the nomad (mobile) device.

Step 16: S/he enters the MyCorridor one-stop-shop or continues using it (as MyCorridor user). MyCorridor shall understand that the traveller is in vehicle mode or the traveller should indicate that to the system.

Step 17: The system knows (from the trip planning phase) the destination (ultimate or intermediate) of the traveller while being in vehicle mode. As such, it provides all the advanced traffic management services the traveller has selected during its MaaS product configuration. As a result, the traveller can experience dynamic navigation service via the device, which includes enhanced traffic management related information such as real time traffic management information & events, zone access control, speed recommendations, in vehicle signage as well as CITS services available.

Step 18: Connection to T6.2 – Traveller feedback (optional).
Step 19: The system (Traveller Activity Statistics module) records the Mobility Products/services use for the internal statistics to be invoked in T6.1 and for T2.

**T3.2 – Configuration, purchase & redemption of personalised MaaS package with multicriteria search (without encompassing trip planning)**

**T3.2.1 - Search using an arbitrary value of a characteristic of the Mobility Products & Services**

Step 1: The traveller types the value of a characteristic of the Mobility Products and Infomobility s/he seeks.

Step 2: The system receives the typed value and searches lexicographically in the Mobility Products and services repository for those that have this value in the corresponding characteristic. If such are found, they are presented to the traveller in a list form. Otherwise, a message, that informs the traveller that there are no products/services compliant with this value, is displayed.

Step 3: The traveller evaluates the set of products/services and chooses the ones s/he prefers - connection to UC T6 – Traveller feedback.

Step 4: Upon confirmation of products/services from the traveller, the final synthesised MaaS package is presented to the user.

Step 5: The traveller has a last chance to edit its package before the final confirmation and checkout - connection to UC T5 – Modification/Cancelation.

Step 6: The traveller proceeds with the payment and denotes willingness to pay.
Step 7: The traveller selects payment method and pays for the MaaS package confirmed.
Step 8: The system confirms payment and returns an e-money voucher (payment receipt) to the traveller as well as the consolidated Mobility Token that is ready for redemption/validation at the operators/providers side. Depending on the selected mobility service providers, the passenger shall receive:

- a single QR code that can be used with all the selected service providers.
- multiple QR codes, where each of them corresponds to a service provider.
- a combination of QR code/username-password.

Step 9: The traveller saves the paid MaaS package (optional step) – feedback to T2.
Step 10: The paid MaaS package is saved by the system in the Travellers Data Repository and specifically in the collection MyPackages.
Step 11: The traveller consumes progressively the (validated in Back-Office – see Use Case B4) Mobility Tokens at the operators.
Step 12: The same steps of T3.1 are valid regarding the redemption of TM2.0 products/services.
Step 13: Connection to T6.2 – Traveller feedback (optional).
Step 14: The system (Traveller Activity Statistics module) records the Mobility Products/services use for the internal statistics to be invoked in T6.1 – feedback to T2.

T3.2.2 - Search by selecting specific predefined values for different search criteria

Step 1: The traveller selects the desired values for the several search criteria available from sets of predefined values. Search criteria will encompass at least Cost, Type of Mobility Product and Service (see Annex 6 for the current inventory of services), Origin-Destination, Modes and Journey time. More than one criteria can be used for searching. For example, the traveller may select the value “Bus” in the criterion Transport Mode and the value “< 20 €” in the Cost criterion.
Step 2: The matchmaking module receives the selected values and searches in the service repository for the mobility products and services that have these values in the corresponding characteristics. If there are such services, they are presented to the traveller in a list form. Otherwise, a message, that informs the traveller that there are no services compliant with these values, is displayed.
Step 3: The traveller evaluates the set of products/services and chooses those s/he prefers - connection to UC T6 – Traveller feedback.
Step 4: Upon confirmation of products/services from the traveller, the final synthesised MaaS package is presented to the user.
Step 5: The traveller has a last chance to edit its package before the final confirmation and checkout - connection to UC T5 – Modification/Cancelation.
Step 6: The traveller proceeds with the payment and denotes willingness to pay.
Step 7: The traveller selects payment method and pays for the MaaS package confirmed.
Step 8: The system confirms payment and returns an e-money voucher (payment receipt) to the traveller as well as the consolidated Mobility Token that is ready for redemption/validation at the operators/providers side. Depending on the selected mobility service providers, the passenger shall receive:

- a single QR code that can be used at all the selected service providers.
- multiple QR codes, where each of them corresponds to a service provider.
- a combination of QR code/username-password.

Step 9: The traveller saves the paid MaaS package (optional step) - – feedback to T2.
Step 10: The paid MaaS package is saved by the system in the Travellers Data Repository and specifically in the collection MyPackages.
Step 11: The traveller consumes progressively the (validated in Back-Office – see Use Case B4) Mobility Tokens at the operators.
Step 12: The same steps of T3.1 are valid regarding the redemption of TM2.0 products/services.
Step 13: Connection to T6.2 – Traveller feedback (optional).
Step 14: The system (Traveller Activity Statistics module) records the Mobility Products/services use for the internal statistics to be invoked in T6.1 – feedback to T2.

**T3.3 - Configuration, purchase & redemption of ready to use MaaS packages**

Step 1: The traveller is presented with the ready to use packages that s/he can select from. In MyCorridor, the packages that will be offered through the platform for testing purposes will be defined in the context of WP7: “Business models, incentives and legal issues”. The Packages may be different per user category (businessman, commuter, etc.) or per type of service or per type of destination. Also, they may be monthly or annual. The composition of packages strongly depends on the offers provided by the service providers and the availability of services and, as such, they will change depending on the changing dynamics in the one-stop-shop. However, this cluster of MaaS Packages is the easiest way to host/couple with initiatives (i.e. discounts) and rewards that the MaaS aggregator may wish to put forward in order to promote, for example, socially-responsible travel behaviour or other monetary oriented objectives (if the applied Business Model allows it).

Step 2: The traveller has a last chance to edit its package before the final confirmation and checkout.
Step 3: The traveller proceeds with the payment and denotes willingness to pay.
Step 4: The traveller selects payment method and pays for the MaaS package confirmed.
Step 5: The system confirms payment and returns an e-money voucher (payment receipt) to the traveller as well as the consolidated Mobility Token that is ready for redemption/validation at the operators/providers side. Depending on the selected mobility service providers, the passenger shall receive:

- a single QR code that can be used at all the selected service providers.
- multiple QR codes, where each of them corresponds to a service provider.
- a combination of QR code/username-password.

Step 6: The traveller saves the paid MaaS package (optional step).
Step 7: The paid MaaS package is saved by the system in the Travellers Data Repository and specifically in the collection MyPackages.
Step 8: The traveller consumes progressively the (validated in Back-Office – see Use Case B4) Mobility Tokens at the operators.
Step 9: The same steps of T3.1 are valid regarding the redemption of TM2.0 products/services.
Step 10: Connection to T6.2 – Traveller feedback (optional).
Step 11: The system (Traveller Activity Statistics module) records the Mobility Products/services use for the internal statistics to be invoked in T6.1.

**Connected Use Cases:** Apart from the Use Cases mentioned in the Prerequisites field above, the T4 – Personalised info support and the B2 – Added value synthetic are connected Use Cases that serve as add-ons of the current Use Case. In addition, T7 – Loyalty scheme/Rewarding is directly connected to this Use Case, working on top of it, depending on the traveller selection. At the same time, the schemes and rules applied for the governance of the one-stop-shop, the loyalty and rewarding schemes will vary.

The same is valid for T4 - Personalised Info support, where push notifications will be provided to the user upon selection of the Mobility Product and the traveller preferences as well as to the T6 – Traveller feedback and T5 - Modification/Cancellation that constitute optional elaboration of the current UC steps (see more in the workflows). Finally, the T2 semi-dynamic part is updated by the user selections and use.

**Benefits for key actor:** This Use Case is the core use case for the travellers that described their key interaction with the one-stop-shop and during which they are able to choose from available options of personalised or not MaaS products configurations. In addition, specifically the multicriteria search functionality of T3.2 can be used in exactly the same way by the MaaS aggregator for the management of the one-stop-shop.
Alternatives & extensions: Slightly alternative flows occur when the user is not registered in the one-stop-shop and are temporary users. Moreover, an alternative flow can occur in the case where there is no registered service that can serve a particular leg of the trip based on the leg's characteristics and the traveller's preferences. In this case, in Step 8 of the ad-hoc MaaS product delivery flow scenario, for the leg that lacks available services in the MyCorridor one-stop-shop, the traveller will be informed by a message that the system cannot provide any solution for this particular leg due to lack of service availability, quoting to third party services, external to MyCorridor.

Prioritisation & discussion:

Table 27: T3 UC Prioritisation.

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<tr>
<th>From Consortium point of view</th>
<th>From project stakeholders' needs phase</th>
<th>Final (aggregated) prioritisation</th>
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<tbody>
<tr>
<td>☑ Essential ☐ Secondary</td>
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Justification: This Use Case is Core for the overall one-stop-shop operation and the optimum final product delivery, as it sums up all alternative workflows for selecting and purchasing MaaS products on the basis of the available registered services and travellers' preferences and feedback.

Concerns & Risks: There are some concerns regarding the implementation of this Use Case, from a technical and user experience point of view. The first concern concerns the delivery speed of the matchmaking module, which affects the overall user experience. In the case of trips with many legs, several registered services in the system and a lot of different travel preferences, the matchmaking module will have to carry out a fairly large number of computations and checks in order to come up with the final synthesis of services. Therefore, special care must be taken to manage efficiently this computing load using appropriate technologies and frameworks.

The second concern is about the case where there is no registered service that can serve a particular leg of the trip based on the leg's characteristics and the traveller's preferences. In this case, the system will inform the traveller that it cannot provide any solution for this particular leg due to lack of service availability and will quote to available third party services, external to MyCorridor, that, again, may not be available, failing utterly to provide a seamless travel experience to the users.

Starting point/background & Innovation in MyCorridor: CERTH/ITI has considerable experience in the problem of matchmaking available services with users’ preferences and feedback. In particular, in the context of the FP7 European project S-CASE – Scaffolding Scalable Software Services [44], CERTH/ITI designed, implemented and delivered a system for matchmaking service synthesis descriptions with available services. In particular, the user provided a description of service synthesis (in an appropriate format) to the system which, in turn, searched lexicographically a repository of services for discovering those services that best complied with the description. In the case of MyCorridor, it will be attempted to create sophisticated matchmaking algorithms that will be based not only on lexicographical correlation between the characteristics of the services and the requests, but also on advanced user-centric approaches like collaborative filtering and context-aware recommendation.
systems. For the experience in profiling and mobile apps, please see T2 respective field. The T3 UC is based also on existing work by the TM2.0 platform.

12.3.1.4 T4 - Personalised Info support (added value services – athletic, touristic, cultural, health push personalised notifications)

**Use Case functional description:** This UC works on top of UC T3 and is optional in the sense that the traveller may not wish to receive any push notification for added value services. As the core objectives of MyCorridor in terms of services are Mobility Services and the Infomobility Services that may assist with the selection or enhanced experience of Mobility Products, Added Value services that are not directly associated with mobility itself are not considered core services and, as such, are not provided by default to the user. Added value services anticipated to be provided through MyCorridor one-stop-shop are athletic, touristic, cultural, health, etc.; any service that may enhance the overall travel experience provided in a way that will fit the specific traveller profile and preferences and according to the trip itinerary or destination(s).

It is important to state that personalised push notifications are provided on pre-trip phase, at the time of the MaaS product configuration, but may also be reminded/updated (with real time info) on-trip and upon the traveller localisation in each destination. The exact same concept is followed for the informatory part of core Mobility Products (i.e. real time info about itineraries in reached locations/destinations of the traveller, etc.) that is considered part of T3.

**Lead Partner responsible:** Wings

**Other Partners involved:** CERTH/ITI, SWARCO MIZAR, SWARCO Hellas, CHAPS, HACON, MAPTm, Brandmkrs, VivaWallet, AMCO

**Relevant WP/Activity:** The added value services per se will be developed in the context of WP4/ A4.4 “Added value services” and will be integrated in MyCorridor one-stop-shop in the context of WP4/ A4.5 “Services integration at and across sites”.

**Technologies used:** The Java and Python programming languages will be used for the development of the added value services composition module. The corresponding Integrated Development Environment (IDE) will be Eclipse Oxygen. The services will be stored and delivered in JSON format. As for the push notifications.

**Prerequisites/Dependencies/Restrictions:** The T1 - User Login/Register/ Authentication and T2 - Static & semi-dynamic profiling are prerequisites for the current Use Case, as, in order for the system to infer applicable push notifications, the traveller profile and preferences need to be taken into account. Furthermore, the travellers should have provided their consent to get push notifications. In this sense, this Use Case/ function is only applicable for registered users. As mentioned again, this Use Case works on top of T3 – Personalised MaaS package selection, purchase and redemption. Another dependency is the availability of added value services for the specific destinations sought by the traveller. For on-trip notifications, geolocalisation is also required.

**Indicative interaction flow scenario:**
This UC is operating on top of T3.1 and T3.2 given that the above mentioned prerequisites are satisfied. Thus, the respective workflows are modified as follows (in **Bold** and *italics* one may see the specific additions regarding personalised push notifications).
T4.1 – Configuration, purchase & redemption of personalised MaaS package (consisting of one or more mobility products) coupled with trip planning and personalised push notifications.

Step 1: The traveller starts by requesting a trip. In particular:
- Step 1.1: The traveller provides the origin and destination point, either by selecting them from a map or by filling an appropriate form.
- Step 1.2: The traveller provides the date and time of the trip either by selecting the appropriate values in a calendar or by filling an appropriate form.
- Step 1.3: The traveller selects preferable modes for the specific travel or types of services s/he prefers (see Annex 6 for the current Inventory of Services). This step is optional. If the user does not wish to denote preferable modes, the system will take into account the preferences recorded in his/her profile.
- Step 1.4: The traveller submits the request.

Step 2: The system receives the traveller’s trip request. As a first step, the MyCorridor trip-planning module searches the service repository for trip-planning services that operate in the geographical area of the origin and destination points within the date and time of the requested trip. If there is any available service, it selects it. Otherwise, it selects the generic open trip-planning module implemented by the system.

Step 3: The (whichever) selected trip-planning module generates the trip.

Step 4: The matchmaking module gets the travel preferences of the traveller from his/her profile and seeks to see if the traveller has given consent in order to receive personalised push notifications.

Step 5: For each leg of the generated trip, the matchmaking module:
- Step 5.1: Gets the main characteristics of the leg, i.e. the origin point, the destination point and the time to complete.
- Step 5.2: Searches the service repository for services that comply with the leg’s main characteristics and the traveller’s travel preferences (including the modes selected/edited by the user).
- Step 5.3: Creates and presents to the traveller a set of appropriate services for the specific traveller for each leg of the trip, further coupled with available personalised added value services that fit to the traveller profile (cultural, sport, health).

Step 6: The traveller evaluates the set of services for each leg of the trip and chooses those s/he prefers, including which of the personalised information would like to keep in the package as a reminder (and that will be pushed later on-trip) - connection to UC T6 – Traveller feedback.

Step 7: Upon confirmation of services for each leg of the trip from the traveller, the final synthesised MaaS package for the whole trip is presented to the user, including the selected personalised information.

Step 8: The traveller has a last chance to edit its package before the final confirmation and checkout - connection to UC T5 – Modification/Cancelation.

Step 9: The traveller proceeds with the payment and denotes willingness to pay.

Step 10: The traveller selects way of payment and pays for the MaaS package confirmed.

Step 11: The system confirms payment and returns an e-money voucher (payment receipt) to the traveller as well as the consolidated Mobility Token that is ready for redemption/validation at the operators/providers side. Depending on the selected mobility service providers, the passenger shall receive:
- a single QR code that can be used with all the selected service providers.
- multiple QR codes, where each of them corresponds to a service provider.
- a combination of QR code/username-password.

Step 12: The traveller saves the paid MaaS package for his/her trip (optional step) – feedback to T2.

Step 13: The paid trip is saved by the system in the Travellers Data Repository and specifically in the collection MyTrips.

Step 14: The traveller consumes progressively the (validated in Back-Office – see Use Case B7) Mobility Tokens at the operators.
Step 15: Connection to T6.2 – Traveller feedback (optional).
Step 16: The system (the Traveller Activity Statistics module) records the Mobility Products/services use for the internal statistics to be invoked in T6.1 – feedback to T2.

**Step 17: While travelling and before reaching the next destination (specific period of time for in-advance notification has to be defined), the corresponding personalised notifications (selected in the configuration process by the traveller) will be pushed to the traveller.**

Push notifications are provided in all modes (vehicle, pedestrian, PT user, etc.). As such it is of no relevance if the Mobility Products are TM2.0 or not; they are only dependent to the localisation of the user and the corresponding services of his/her interest.

T4.2 – Configuration, purchase & redemption of personalised MaaS package with multicriteria search (without encompassing trip planning) coupled with personalised push notifications.

**T4.2.1 - Search using an arbitrary value of a characteristic of the Mobility Products & Services**

Step 1: The traveller types the value of a characteristic of the Mobility Products and Infomobility s/he seeks.

Step 2: The system receives the typed value and searches lexicographically in the Mobility Products and services repository for those that have this value in the corresponding characteristic. If there are such ones, they are presented to the traveller in a list form. Otherwise, a message, that informs the traveller that there are no products/services compliant with this value, is displayed.

Step 3: The traveller evaluates the set of products/services and chooses those s/he prefers - connection to UC T6 – Traveller feedback.

Step 4: Upon confirmation of products/services from the traveller, the final synthesised MaaS package is presented to the user.

Step 5: The traveller has a last chance to edit its package before the final confirmation and checkout connection to UC T5 – Modification/Cancelation.

**Step 6: Upon confirmation and if in the MaaS package configured, there are products associated with specific destinations, then the matchmaking model seeks to see if the traveller has given consent in order to receive personalised push notifications and infers the associated personalised information (that fits to the traveller profile).**

**Step 7: The traveller configures which of the proposed personalised info should be kept in order to be sent as reminder to him/her later on trip and confirms.**

Step 8: The traveller proceeds with the payment and denotes willingness to pay.

Step 9: The traveller selects way of payment and pays for the MaaS package confirmed.

Step 10: The system confirms payment and returns an e-money voucher (payment receipt) to the traveller as well as the consolidated Mobility Token that is ready for redemption/validation at the operators/providers side. Depending on the selected mobility service providers, the passenger shall receive:

- a single QR code that can be used with all the selected service providers.
- multiple QR codes, where each of them corresponds to a service provider.
- a combination of QR code/username-password.

Step 11: The traveller saves the paid MaaS package (optional step) – feedback to T2.

Step 12: The paid MaaS package is saved by the system in the Travellers Data Repository and specifically in the collection MyPackages.

Step 13: The traveller consumes progressively the (validated in Back-Office – see Use Case B4) Mobility Tokens at the operators.

Step 14: The same steps of T3.1 are valid regarding the redemption of TM2.1 products/services.

Step 15: Connection to T6.2 – Traveller feedback (optional).

Step 16: The system (Traveller Activity Statistics module) records the Mobility Products/services use for the internal statistics to be invoked in T6.1 – feedback to T2.
Step 17: While travelling and while approaching a destination where a Mobility Product is to be consumed or there is an associated added value service, the corresponding personalised notifications (selected in the configuration process) are pushed to the traveller.

Similar workflow is anticipated for T4.2.2 - Search by selecting specific predefined values for different search criteria.

Connected Use Cases: See in Prerequisites field. T1-T3 use cases are prerequisite UCs to this one. Also, another sense of added value services (although of different nature) is provided through B2 – Added value synthetic service composition, though those services are emerging from core mobility and infomobility services and are listed among other in the services repository of the one-stop-shop to be used in the configuration and selection process and not as push notifications.

Benefits for key actor: The scope of this additional UC/function of the one-stop-shop is to enhance the overall experience of MaaS with tailored information that is not strictly associated to mobility but to the holistic travel experience and Quality of Life.

Alternatives & extensions: The specific types of personalised info to be provided as push notification to the traveller will be recognised in the context of A4.4, as the project evolves.

Prioritisation & discussion:

Table 28: T4 UC Prioritisation.

<table>
<thead>
<tr>
<th>From view</th>
<th>Consortium point of view</th>
<th>From project needs phase</th>
<th>Stakeholders’ needs phase</th>
<th>Final prioritisation (aggregated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Essential ☒ Secondary</td>
<td>□ Essential ☒ Secondary</td>
<td>□ Essential ☒ Secondary</td>
<td>□ Essential ☒ Secondary</td>
<td></td>
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</tbody>
</table>

Justification: This UC is not dealing and does not influence the core Mobility Products provided through the one-stop-shop. It serves only as an add-on. As such, is considered a secondary case.

Justification: Prioritisation as emerging from Pan-European workshop outcomes (Table 9).

Concerns & Risks: The key concern here is related to the notion of advertisement of specific events/services (cultural, sport, etc.).

Both the GDPR and the Privacy and Electronic Communications Regulations (“PECR”) need to be considered here. Whilst it is likely MyCorridor will require valid consent from individuals prior to advertising any such events under the GDPR, a “soft opt-in” exception (set out below) does exist (at least under UK PECR) in relation to direct marketing and whether it would be lawful to rely on this exception should be explored:

- where a person's details have been obtained in the course of a sale or negotiations for a sale of a product or service;
- where the messages are only marketing similar products or services; and
- where the person is given a simple opportunity to refuse marketing when their details are collected, and if they don't opt out at this point, are given a simple way to do so in future messages.
If MyCorridor replies on valid consent, it must ensure that it meets the consent threshold under the GDPR. This means that consent must be an unambiguous indication by means of a statement or by clear affirmative action and must be freely given, i.e. the data subject must have taken a deliberate action to consent to the particular processing (Recital 32 GDPR). Note that the use of pre-ticked opt-in boxes is invalid under the GDPR.

Moreover, the UK Regulator (the "ICO") has provided guidance on consent, highlighting Recital 43 of the GDPR, which states that consent is presumed to have not been freely given if separate consent has not been obtained for each data processing operation, i.e. when the processing has multiple purposes, consent should be given for all of them.

When such an advertisement will come from third parties, or if any third party has access to an individual's personal data as a result of such an advertisement, MyCorridor must also consider whether this has been clearly communicated to the individual and whether there are lawful grounds for passing to a third party (or a allowing a third party to access) an individual's personal information. In compliance with the GDPR, MyCorridor will ensure that its privacy policy clearly states which third parties it is sharing personal information with (if any) and the reason for sharing this personal information with each third party or category of third parties. Appropriate data processing agreements would also have to be in place.

Under Article 22 of the GDPR, automated decision making is a decision based solely on automated processing (which could include profiling) and which produces legal effects for an individual or similarly significantly affects them. MyCorridor must pay particular attention to whether it is profiling individuals prior to advertising specific events and services and must ensure that if it does, it does so in accordance with the GDPR and all applicable laws and regulations. Whilst, as WP29 guidance indicates, it is unlikely that such profiling and advertising would significantly affect an individual, if automated decision making will be carried out by MyCorridor, we should include in this privacy policy details of: (i) the types of profiling or automated decisions; (ii) the logic involved in such process; and (iii) the consequences of such processing.

**Starting point/background & Innovation in MyCorridor:** Towards this UC, WINGS will leverage expertise stemming from a number of EU R&D projects, such as H2020 iKaaS – intelligent Knowledge as a Service (http://ikaas.com) and KaaS_SCL, an extension of the iKaaS platform that was among the winners of the H2020 FIESTA-IoT 3rd Open Call. In the scope of the aforementioned projects, WINGS delivered, among others, a mobile application that provided personalised services to the user, including optimal routing within the city taking into consideration medical conditions (e.g., allergies or mobility-related disabilities), traffic status and weather conditions, as well as various user preferences, in general. Within MyCorridor, an innovative component providing functionality relevant to the personalised added-value services will be developed and integrated to the core MyCorridor system. As such, the traveller will be able to define a set of additional characteristics pertaining to her/his interests, for instance, and let the MyCorridor platform suggest routes involving possibly interesting to the user events relevant to sports, culture, etc. At the same time, the traveller will be able to define any medical issues s/he may be experiencing, so that they can be taken into consideration whole calculating the optimal route to the selected destination.

12.3.1.5 **T5 - Modification/Cancelation**

**Use Case functional description:** This Use Case is in reality an optional part of T3 – Personalised MaaS Package selection, purchase and redemption and is inferred in the step where “The traveller has a last chance to edit its package before the final confirmation and checkout”. As such, before final confirmation and before proceeding to payment, the traveller will be provided with the option to modify the current
MaaS product configuration if and as s/he wants to, or even cancel the selection of part of the whole of the package suggested.

**Lead Partner responsible:** CERTH/ITI (concerning the backend mechanism).

**Other Partners involved:** UPAT and CERTH/HIT (regarding the frontend).

**Relevant WP/Activity:** This Use Case will be implemented in the context of WP3/A3.1 – Service delivery platform (backend) and in WP5/A5.2: UCD UI design and development and A5.4: Development of mobile interfaces for all types of devices (for the frontend).

**Technologies used:** The front-end part will be implemented using Android (Java) and iOS (objective C) programming languages, according to the target platform. For the back-end part, Python Eve REST API framework and MongoDB will be used. As it has been anticipated, the whole interaction workflow will take place through mobile apps in Android and iOS.

**Prerequisites/Dependencies/Restrictions:** Same as in T3 - Personalised MaaS package configuration, purchase & redemption. Also, the traveller needs to have concluded the configuration process of T3. Use Case can not be implemented after the traveller has proceeded with the payment.

**Indicative interaction flow scenarios:**

*This Use Case reflects the analytical process that takes place in the context of Step 8 of T3.1 and Step 5 of T3.2.*

**T5.1 - Modify selected mobility products**

Regarding T3.1:

Step 1: As soon as the traveller is provided with the final Mobility Products the system has configured for him/her and upon the selections s/he has made afterwards, and before the confirmation of the overall package, the traveller changes his/her mind about the services appearing in one or more legs of the trip and decides to step back and make changes.

Step 2: The traveller selects the trip legs s/he wishes to modify and adds/replaces/removes mobility products. In the case that there is no trip planning part, s/he directly modifies respectively the list of the mobility products.

Step 3: The traveller confirms the modification and proceeds once again with the checkout.

**T5.2 - Cancel the selection of all mobility products**

Step 1: As soon as the traveller is provided with the final Mobility Products the system has configured for him/her and upon the selections s/he has made afterwards, and before the confirmation of the overall package, the traveller changes his/her mind about the services appearing in one or more legs of the trip and decides to step back and cancel the whole configured package.

Step 2: The traveller cancels the whole package, confirms cancelation and if s/he wishes, s/he starts over (redirection to UC T3). Alternatively, the traveller is able to cancel only some legs of the trip (in terms of mobility products associated with them) and not the entire trip.

*A similar workflow is followed in the case of T3.2.*

**Connected Use Cases:** As in T3. Also, in the case of cancellation (2nd scenario), there is a redirection to UC T3.
**Benefits for key actor:** The traveller will be able to edit and/or cancel the configuration of the MaaS package before final confirmation and payment. This is considered a compulsory process of an interaction with any web/mobile service/app.

**Alternatives & extensions:** Possibility for a traveller to modify or cancel a purchase s/he made, after the payment has been proceeded. This option will be investigated while the implementation progresses and affects the back-office operations. In a commercial system, all traveller funds are returned with the exemption of the transaction fee (still this will not be the case in MyCorridor).

**Prioritisation & discussion:**

<table>
<thead>
<tr>
<th>From Consortium point of view</th>
<th>From project stakeholders’ needs phase</th>
<th>Final (aggregated) prioritisation</th>
</tr>
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<tbody>
<tr>
<td>✗ Essential □ Secondary</td>
<td>□ Essential ✗ Secondary</td>
<td>✗ Essential (for 2nd Pilot iteration) □ Secondary</td>
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</table>

**Justification:** This operation should be considered as Essential, since otherwise the traveller would not have the chance to change or cancel the selection of services s/he did in first place, resulting in a dissatisfactory user experience. The option to edit/cancel choices made in previous steps allows adaptation and flexibility and is considered a compulsory process in such interactions.

**Justification:** Prioritisation as emerging from Pan-European workshop outcomes (Table 9).

**Justification:** In order to align with both perspectives (the Consortium and the stakeholders), it has been decided that this Use Case/function will be implemented but it is enough that it will be ready only for the 2nd phase real life pilots of the project, where it will have more value.

**Concerns & Risks:** The concern here is related to the possibility for a user to change or cancel a purchase s/he made, after the payment has been proceeded. This option will be investigated while the implementation progresses.

**Starting point/background & Innovation in MyCorridor:** Similar functionality has been provided in other projects in which CERTH/ITI and CERTH/HIT participated, such as the H2020 European project SocialCar - Open social transport network for urban approach to carpooling (http://socialcar-project.eu/) and the FP7 European project MOVESMART - Renewable Mobility Services in Smart Cities (https://cordis.europa.eu/project/rcn/110310_en.html), where the users were able to change and/or cancel selections they made in previous steps. No specific innovation is applied here; typical interaction process.

**12.3.1.6 T6 - Traveller feedback**

**Use Case functional description:** Part of this Use Case is in reality an optional part of T3 – Personalised MaaS Package selection, purchase and redemption and is inferred in the step where “The traveller evaluates the set of services for each leg of the trip and chooses those s/he prefers”. In specific, the traveller will be able to view other travellers’ feedback options and, if s/he wishes, take them into account for his/her own selections. The other part of this Use Case refers to the feedback of the traveller...
on the services/Mobility Products used but also on the overall MaaS service experience as offered through the one-stop-shop. This Use Case would be also considered an added value service itself.

**Lead Partner responsible:** HaCon

**Other Partners involved:** CERTH/ITI, SWARCO Hellas, Chaps, MapTM, RSM and SRFG

**Relevant WP/Activity:** This Use Case will be implemented in the context of WP3 - One stop shop implementation and modules in activity A3.4 - Traveller Feedback - HaCon and also in WP5 - Personalised, context-aware and inclusive UIs, both in A5.2: UCD UI design and development – UPAT and A5.4: Development of mobile interfaces for all types of devices – CERTH/HIT.

**Technologies used:** The front-end part will be implemented using Android (Java) and iOS (objective C) programming languages, according to the target platform. For the back-end part, a MongoDB will be used. For the back-end implementation, the Python Eve REST API framework will be used and also for storing the traveller feedback information the No SQL, MongoDB will be used.

**Prerequisites/Dependencies/Restrictions:** As in T3.

**Indicative interaction flow scenarios:**

**T6.1 - View information of other travellers**

*This part of the Use Case reflects the optional analytical process that takes place in the context of Step 6 of T3.1 and Step 3 of T3.2: “The traveller evaluates the set of services and chooses those s/he prefers” (part of “evaluation”).*

Step 1: A detailed screen per leg of the trip will be shown to the traveller including information from other travellers regarding the MaaS services used in the past across Europe. The information provided consolidates travel performance tracking data (i.e. frequency of service/product use, combination with other services/products) as well as subjective feedback provided (optionally) by the travellers (see next sub Use Case).

Step 2: The traveller may take that into account for his/her final decision and before confirmation.

*The following sub Use Cases constitute an optional step that takes place upon the completion of T3 (normally after redemption of purchased Mobility Products).*

**T6.2 - Provide feedback for other travellers**

Step 1: A registered traveller logs in the MyCorridor one-stop-shop and, upon authentication from the system (Connection to UC T1), s/he searches for a specific Mobility Product/service (connection to T3.2) or retrieves one of his/her saved trips/MaaS Packages (Traveller Feedback module).

Step 2: The traveller selects the Mobility Product/Service for which s/he wishes to provide feedback and presses the add feedback icon.

Step 3: The feedback form pops-up consisting of closed and open (free text) fields, also providing the option to upload photos/videos. All fields are optional.

Step 4: Upon completion of his/her feedback, the traveller presses the send button and hereby provides his/her feedback.

Step 5: The system stores the traveller feedback in the Travellers Data Repository and specifically in the collection MyFeedbacks.

Step 6: The traveller earns some rewarding points– Connection to T7 – Loyalty scheme/ Rewarding (if allowed by the loyalty scheme applied).

**T6.3 - Provide feedback for MaaS**
In an identical workflow as the above, the traveller provides feedback for the overall experience with the MaaS platform. In this case, the feedback form also serves as a complaint form.

The specific format of the feedback to/from the travellers will be developed in A3.4 of the project.

Connected Use Cases: As in Prerequisites field. In addition, in the context of T6.1, the T3.2 may be invoked.

Benefits for key actor: The traveller is provided with the option to view other travellers’ feedback and ratings of the one-stop-shop services but also overall experience and also provide his/her own feedback respectively. This is considered an added value function that aims to enhance the overall experience of the user and strengthen the social aspects of the solution.

Alternatives & extensions: A possible extension of this Use Case/function that would potentially prove to be attractive in the actual deployment of the one-stop-shop is the creation of a social interaction area in the one-stop-shop or through social media, where MyCorridor users would be able to exchange more information about the services and products of the platform as well as the overall experience gained through it. Another interesting extension of the traveller feedback notion would be the creation of a co-design platform where travellers would provide feedback for new services composition that would be of value (connection to B2 – Added value synthetic) or overall functions of the one-stop-shop that would be beneficial and would increase the overall user experience.

Prioritisation & discussion:

<table>
<thead>
<tr>
<th>From Consortium point of view</th>
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<th>Final (aggregated) prioritisation</th>
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<td>☐ Essential ☒ Secondary</td>
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Justification: This operation should be considered as secondary as it provides additional information that it is up to the traveller to provide or take into account. Neither part of the Use Case is a prerequisite for the core functionalities.

Justification: Prioritisation as emerging from Pan-European workshop outcomes (Table 9).

As justified by the next columns. However, though this seems to be of secondary priority for the product, traveller feedback is addressed in the project through a dedicated task of the workplan (A3.4), and, as such, it will be implemented and tested together with other functions.

Concerns & Risks: Traveller feedback is optional. Once it is collected it is anonymously aggregated for the purpose of creating anonymous statistics which will provide users with an indication of preferred methods or routes of transport. In addition to these statistics, individuals will be able to provide feedback directly to the platform for other users to see.

Recital 26 of the GDPR states that if data is properly anonymised to the extent that a data subject is no longer identifiable, the principles of data protection may no longer apply to that data.

Any risk predominantly lies in the data that an individual has provided in the feedback form or via the platform, before it has been anonymised. The lawful ground relied on for processing this information needs to be carefully considered. Consent or legitimate interests will be the most likely grounds in the case of processing feedback openly provided by an individual. Note that (as stated previously) the
threshold for valid consent under the GDPR is higher than under existing laws. Consent must be an unambiguous indication by means of a statement or by clear affirmative action, i.e. the data subject must have taken a deliberate action to consent to the particular processing (Recital 32 GDPR). Note that the use of pre-ticked opt-in boxes is invalid under the GDPR.

Consideration needs to be given to the processing of this information, including who has access to this un anonymised information, how is this information shared and how is it stored? Ensuring both a clear and transparent privacy policy and consumer facing terms and conditions are in place and easily accessible to users is imperative, to ensure users fully understand how their data is being processed. In addition, data processing and data sharing agreements will likely be required between consortium entities prior to the transfer of any data. Any processing of data (including collection, sharing and storage of this data) must be in compliance with all applicable data protection laws.

The UK Regulator (the Information Commissioner’s Office (the “ICO”)) has issued guidance suggesting that even where an entity is not required to appoint a data protection officer (a "DPO") under the GDPR, it is recommended that a DPO is in place. A DPO can assist by helping entities comply with applicable data protection laws and monitor this compliance. Overall, this will help the MyCorridor entities with their data protection governance structure and accountability. If a DPO is appointed, the DPO’s contact details must be clearly set out in this privacy policy and ideally in the first information layer of the privacy policy, to meet the transparency requirements of the GDPR.

Prior to processing any data, entities may have to register their processing activities with their respective data protection authority. This will depend on local law requirements; therefore, each entity processing personal data in relation to MyCorridor must check these requirements prior to handling any personal data.

Starting point/background & Innovation in MyCorridor: Similar functionality has been provided in other projects in which HaCon participated, such as the DYNAMO – Dynamische, nahtlose Mobilitätsinformation (dynamic seamless information for mobility) funded by the German “Federal Minister for Economic Affairs and Energy” (http://www.dynamo-info.eu/), where the users were able to get and provide feedback to other travellers or authorities. The innovation with MyCorridor is to develop an operator and front end independent solution that allows to collect and provide traveller feedbacks.

12.3.1.7 T7 - Loyalty scheme (encompassing incentivisation & rewarding)

Use Case functional description: For the sake of the MyCorridor one-stop-shop demonstration and evaluation, indicative loyalty schemes will be applied encompassing incentivisation and rewarding schemes and policies. The MyCorridor customer will be automatically enrolled to them. The respective terms and conditions are set by the MaaS aggregator in the framework of B1 – Overall Business Rules editing. Those are anticipated to change dynamically and following the B2B relations between the aggregator and the service providers.

The customer will always be able to view the currently valid terms and conditions, his/her loyalty (and rewarding) points as well as all valid (at the period) incentives provided in order to determine his/her purchasing decisions.

Lead Partners responsible: VivaWallet, IRU

Other Partners involved: CERTH/ITI (for the implementation), SWARCO Hellas and service providers (internal and external)
Relevant WP/Activity: The indicative loyalty, incentives and rewarding schemes that will be applied in the one-stop-shop and evaluated in the Pilots will be defined later in the project according to the workplan in the context of WP7: “Business models, incentives and legal issues” and, more specifically, in A7.2: “Novel financing, pricing, taxation and other incentive strategies and models” and A7.3: “Socially responsible travel incentives and promotion schemes”. Their implementation in the one-stop-shop will take place in WP3/A3.1: “Service delivery platform”.

Technologies used: This Use Case will be implemented by the Business Rules Editing module. The Java programming language will be used for the development of the Business Rules Editing module. The corresponding Integrated Development Environment (IDE) will be Eclipse Oxygen.

Prerequisites/Dependencies/Restrictions: As mentioned above, dependencies are related to the evolving B2B relations between the aggregator and the service providers, that will guide the issue of the loyalty and rewarding schemes on the level of the one-stop-shop platform.

MyCorridor will have to ensure that it can rely on appropriate legal grounds prior to automatically signing up any MyCorridor customer to a loyalty scheme, e.g., will MyCorridor be able to rely on legitimate interests; performance of a contract or will it require consent from the individual prior to making these loyalty offers?

Depending on how the loyalty scheme is to function in practice, any loyalty scheme offer may be considered marketing, in which case, MyCorridor will have to ensure that it has valid consent from the individual. That said, the UK PECR does offer the soft opt-in exception set out above, which MyCorridor should explore.

In any event MyCorridor will have to ensure that its privacy policy and terms and conditions clearly set out the relevant information to individuals and that these documents are clear, transparent and placed in a prominent, and easily accessible place for individuals, both in-app and on the MyCorridor website.

Indicative interaction flow scenarios:
This Use Case is horizontal and works on top of T3.

Step 1: Upon T1 user login, the traveller is able to select from the one-stop-shop menu “Loyalty/Rewarding”.

Step 2: Upon the traveller selection, the system provides the user with two options:
Step 2.1: View terms and conditions. S/he is able to see how the loyalty and rewarding scheme works (for the current period of time). Moreover, the terms under which to use the scheme.
Step 2.2: View his/her own history and current status of loyalty points and/or rewarding vouchers – number of loyalty points currently available and/or number of rewarding schemes used, number of rewarding schemes that remain to be used and their expiration date.

Step 3: If there are any specific rewarding schemes attached to each Mobility Product, it is visible to the customer during the configuration phase, whereas the loyalty status and history are updated accordingly after the purchasing phase (connection to T3).

Connected Use Cases: This UC is a cross-cutting UC connected to T1 and T3, whereas the loyalty principles are defined in the context of B1. Depending the schemes applied, there might be an association with T4 (see in Benefits below).

Benefits for key actor: Depending on the nature of incentives and rewarding schemes applied, the traveller may benefit on a monetary basis (free toll passage, free uses of services, etc.) or be able to
receive other types of benefits (i.e. free pass in zone access areas, free tickets for events – connection to T4, etc.). Overall, the loyalty part of the one-stop-shop allows the user to remain attached to the application and motivates him/her to frequently use it in order to maintain his/her loyalty status and enjoy the benefits. Apart from that, and if the incentivisation and rewarding schemes applied are socially inclusive and/or environmentally friendly, the socially/environmentally responsible use of MaaS or the environment can be anticipated.

Alternatives & extensions: -

Prioritisation & discussion:

Table 31: T7 UC Prioritisation.

<table>
<thead>
<tr>
<th>From Consortium point of view</th>
<th>From project stakeholders’ needs phase</th>
<th>Final (aggregated) prioritisation</th>
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<td>☐ Essential ☒ Secondary</td>
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**Justification:** While a secondary feature at the platform side (i.e. the traveller mainly enters to purchase mobility products), it could become powerful tool to influence travellers’ behavior. The loyalty/rewarding policies can be used to influence travellers' decisions towards modal shift and/or environmental friendly travel decisions. Moreover it is a significant marketing tool to increase MyCorridor usage.

<table>
<thead>
<tr>
<th>Justification: Prioritisation as emerging from Pan-European workshop outcomes (Table 9).</th>
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<tbody>
<tr>
<td>Though it is considered as a secondary function from both Consortium and the experts, the MyCorridor Consortium will investigate the possibility and, mainly, the feasibility (and given the availability of resources) to apply indicative loyalty and rewarding schemes in the one-stop-shop that will be piloted. The key reason for this is to be able to have a proof of concept of the importance of them in MaaS real life operation and provide evidence for the packages that will be proposed in the context of WP7.</td>
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Concerns & Risks: Will be specifically dealt within the framework of WP7.

Starting point/background & Innovation in MyCorridor: Similar functionality has been provided in other VIVA projects (http://www.viva.gr/), where loyalty and rewarding schemes are used. No specific innovation is applied here; typical interaction process.

12.3.2 Service Providers Use Cases

12.3.2.1 S1 - Service provider log-in

Use Case functional description: The service provider will be able to login to the Service Registration Tool by visiting the registration tool webpage. There, the user will register to the tool and acquire a username and a password or, if s/he has already registered to the tool, will submit their credentials. The tool will verify the credentials and, if they are correct, will log the service provider in, enabling him/her to proceed with the service registration or to view and optionally edit their already registered service and the agreed business rules that have emerged upon negotiation with the system.
Lead Partner responsible: CERTH/ITI

Other Partners involved: -

Relevant WP/Activity: WP3/ A3.1: “Service delivery platform”

Technologies used: HTML, CSS, JavaScript, JQuery, Bootstrap, Python/Eve

Prerequisites/Dependencies/Restriction: The service provider needs network access from any device with an Internet browser installed.

Indicative interaction flow scenarios:

S1.1 - Registered service provider
Step 1: The service provider opens an Internet browser and navigates to the registration tool URL.
Step 2: The service provider fills in their user name and password in the form and submits it.
Step 3: The system identifies the service provider’s credentials and logs him/her in the registration tool.
Step 4: The service provider can proceed with the registration of his/her service (UC S2) or view/further edit their already registered service and the agreed business rules.

S1.2 - New/unregistered service provider
Step 1: The service provider opens an Internet browser and navigates to the registration tool URL.
Step 2: The service provider chooses the option to register.
Step 3: The system provides him/her with a form to fill in his/her desirable user name and password.
Step 4: If the system approves the user name and password, it successfully registers the service provider to the registration tool.
Step 5: The service provider can now login to the registration tool by following the steps in 1st case.

Connected Use Cases: S2 - Service registration and S3 - Service provider business rules editing are using the output of this as its starting point.

Benefits for key actor: The key user of this UC is the service provider. This use case enables the service provider to login to the Service Registration Tool of MyCorridor after being successfully authenticated or to create an account if they have not already gone through the process, in order to register his/her service or to view and edit his/her already registered service and its business rules.

Alternatives & extensions: Alternative ways of logging in the service registration tool instead of using user name and password, beyond the scope of MyCorridor, would be using three-step verification (with a code sent to an already registered mobile smartphone) or a smartphone security application that scans a code on the Internet browser screen before clearing the service provider for logging in.

Still, the most important extension here refers to the type of service providers that may log-in and be part of MyCorridor. It should be stressed that a key category of them would be other MaaS aggregators that are operating in another area. Those are service providers themselves and, again, should define - as any service provider - their business rules, etc. following the sequence of all relevant Use Cases (S1-S3). Still, the interoperability issues that emerge in this case are much greater. This specific extension will be explored in MyCorridor and will be reflected in the System Architecture; it remains to see if it can be also demonstrated during demonstration/evaluation phase with an internally identified MaaS aggregator or, potentially, with an external one to be recognised later in the project.
Prioritisation & discussion:

Table 32: S1 UC Prioritisation.

<table>
<thead>
<tr>
<th>From Consortium point of view</th>
<th>From project stakeholders' needs phase</th>
<th>Final (aggregated) prioritisation</th>
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<tr>
<td>☒ Essential ☐ Secondary</td>
<td>☒ Essential ☐ Secondary</td>
<td>☒ Essential ☐ Secondary</td>
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</table>

**Justification:** This specific UC should be considered an Essential one since it reflects a necessary prerequisite action in order to allow service providers to login to the service registration tool and, consequently, join the MyCorridor one-stop-shop and proceed with further actions (i.e. service registration). This is the only automatic way to add services to the MyCorridor services database, which is the basis of the product.

**Concerns & Risks:** The only concern when sending private data, such as user names and passwords, is the security of the data, which must be guaranteed.

**Starting point/background & Innovation in MyCorridor:** Similar tools and mechanisms have been developed by CERTH/ITI in the previous project S-CASE — Scaffolding Scalable Software Services (2013: Pervasive and Trusted Network and Service Infrastructures) [44] (https://www.iti.gr/iti/projects/S-CASE.html). There is no innovation applicable in this case; it is a mandatory operation. Still, the overall notion of automatic registration of services – that is reflected through this set of Use Cases - through a web tool is innovative itself.

**12.3.2.2 S2 - Service registration**

**Use Case functional description:** The service provider will be able to register their service to be used in MyCorridor after logging in to the Service Registration Tool.

**Lead Partner responsible:** CERTH/ITI

**Other Partners involved:** -

**Relevant WP/Activity:** WP3/ A3.1: “Service delivery platform”

**Technologies used:** HTML, CSS, JavaScript, JQuery, Bootstrap, Python/Eve

**Prerequisites/Dependencies/Restrictions:** S1 - Service provider log-in UC is a prerequisite. The service provider needs network access from any device with an Internet browser installed.

**Indicative interaction flow scenarios:**
Step 1: The service provider opens an Internet browser, navigates to the Service Registration Tool URL and logs in.
Step 2: The service provider selects the option to register his/her service to the registration tool.
Step 3: The service provider fills in the form with the mandatory data and metadata required to register his/her service and s/he submits it.
Step 4: The system saves the data to the service repository and informs the service provider of the success or failure of the operation.

Connected Use Cases: S1 - Service provider log-in UC is a prerequisite for the current UC, whereas S3 - Service provider business rules editing is using its output.

Benefits for key actor: The key user of this UC is the service provider. This UC enables the service provider to register his/her service to the MyCorridor service repository in order for the application to use it.

Alternatives & extensions: A possible extension beyond MyCorridor is the addition of new and more complex metadata for the registered service. The new metadata could help in the personalisation efficiency of the application.

Prioritisation & discussion:

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Justification: This specific use case should be considered as an Essential one as it will allow the automatic feed of the one-stop-shop with services (which is core to the success of the MaaS platform).

Concerns & Risks: The only concern when sending private data, such as the details and metadata of the service, is the security of the data, which must be guaranteed.

Starting point/background & Innovation in MyCorridor: Similar tools and mechanisms have been developed by CERTH/ITI in the previous project S-CASE — Scaffolding Scalable Software Services (2013: Pervasive and Trusted Network and Service Infrastructures) (https://www.iti.gr/iti/projects/S-CASE.html) [44]. The innovation here lies in the mechanism of checking if the business rules of the service to be registered comply with the overall business rules policy set up by the MaaS aggregator.

12.3.2.3 S3 - Service provider business rules editing

Use Case functional description: The service provider will be able to set-up and edit the business rules of his/her service according to their needs, such as the coverage area of the service, pricing, offers, discounts, etc. with the purpose to incentivise the users on selecting this service over a similar one offered by a competitive entity. Once those options will be activated by the MaaS Aggregator (see UC B1 - Overall Business Rules editing) the matchmaking module can use these business rules in order to offer the best-personalised options to the user, through the application. The initial set of values for the
several business rules will be defined based on the overall business rules policy set up by the MaaS aggregator. Every time a service provider will try to modify the business rules of his/her service, the changes will be checked against the predefined ranges, and only if they comply with these ranges, they will proceed.

**Lead Partner responsible:** CERTH/ITI

**Other Partners involved:** SWARCO Hellas

**Relevant WP/Activity:** WP3/ A3.3: “Business rules implemeneter module”

**Technologies used:** HTML, CSS, JavaScript, JQuery, Bootstrap, Python/Eve

**Prerequisites/Dependencies/Restrictions:** Prerequisites are UCs: *S1 - Service provider log-in & S2 - Service registration*. The service provider needs network access from any device with an Internet browser installed.

**Indicative interaction flow scenarios:**

1. The service provider opens an Internet browser, navigates to the Service Registration Tool URL and logs in.
2. The service provider chooses his/her service and selects business rules.
3. The system (on behalf of the MaaS aggregator) returns a list of business rules with the default values or the values previously set by the owner of the service.
4. The service provider can view and change any rule, only if this change complies with the overall business rules policy set up by the MaaS aggregator.
5. The service provider saves the ruleset and the system stores it to the database.

**Connected Use Cases:** Before the current UC, the previous two need to take place: *S1 - Service provider log-in and S2 - Service registration*. There is also a connection to *B1 – Overall Business Rules editing*.

**Benefits for key actor:** The key user of this UC is the service provider. This UC enables the service provider to add or edit the business rules of their registered service to maximise profitability through MyCorridor.

**Alternatives & extensions:** A possible extension beyond MyCorridor is the addition of specific business rules for each area of every country where MyCorridor is available, in order to back up the personalised experience of each area's users (in terms of context).

**Prioritisation & discussion:**

**Table 34: S3 UC Prioritisation.**

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<th>From Consortium point of view</th>
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**Justification:** This specific use case should be considered as an Essential one since it is important to set business rules for each service for the proper functioning of MyCorridor and in

**Justification:** Prioritisation as emerging from Pan-European workshop outcomes (Table 9).

**Justification:** In order to align with both perspectives (the Consortium and the stakeholders), it has been decided that this Use Case/function will be
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<td>order to guarantee that equity rules are being respected. Lacking business rules would result in unavailable services for the travellers. For example, if a service provider does not provide essential information for the business rules of the service (e.g. operational times of the day) there is the case that this service may not be selected by the matchmaking module.</td>
<td></td>
<td>implemented but will be delivered during the 2nd phase of the real life pilots of the project, where it will have more value.</td>
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**Concerns & Risks:** The only concern when sending private data, such as prices and offers, is the security of the data, which must be guaranteed.

**Starting point/background & Innovation in MyCorridor:** Relevant tools and mechanism have been developed by CERTH/ITI in the previous project S-CASE — Scaffolding Scalable Software Services (2013: Pervasive and Trusted Network and Service Infrastructures) [https://www.iti.gr/iti/projects/S-CASE.html](https://www.iti.gr/iti/projects/S-CASE.html). [44] The innovation here lies in the mechanism of checking if the business rules of the service to be registered comply with the overall business rules policy set up by the MaaS aggregator.

### 12.3.3 Back-end Use Cases

#### 12.3.3.1 B1 - Overall Business Rules editing

**Use Case functional description:** The MaaS aggregator will be able to set up and edit overall business rules for the Mobility Products offerings to the travellers, which will take into account the individual service provider’s business rules. The overall business rules will define the MaaS service terms and conditions, as well as pricing policy. Furthermore, the aforementioned business rules are defining the loyalty/incentivisation and rewarding policy of the platform. The incentivisation strategies may include financial instruments (i.e. discounts or offers for use of specific services/products), socially responsible instruments (e.g., eco driving alerts), etc.

**Lead Partner responsible:** CERTH/ITI

**Other Partners involved:** SWARCO Hellas, IRU, VivaWallet, OC, which as part of WP7 should provide sample (and perhaps alternative) business rules covering the above items towards validation.

**Relevant WP/Activity:** WP3/A3.1 (for the implementation part) & WP7 (for the theoretical part).

**Technologies used:** HTML, CSS, JavaScript, JQuery, Bootstrap, Python/Eve

**Prerequisites/Dependencies/Restrictions:** As a prerequisite, the *UC S3: Service provider business rules editing* has to take place in advance, whereas the current UC is a prerequisite for *B2: Added value synthetic*. The MaaS aggregator executing this task should be certified to do so and have access to the platform.
Indicative interaction flow scenarios:
Step 1: The MaaS aggregator logs in the overall Business Rules editor page and through a pop-up menu, s/he defines/edits the following:
   1. The general terms and conditions.
   2. The privacy policy and access conditions.
   3. The pricing and taxation policy.
   5. The incentives and rewarding schemes attached to each mobility service/product or bundle of them.
Step 2: Proceeding to the next step, s/he defines the conditional parameters applicable for each of the above items. For example, time of validity, applicability for specific countries or for specific types of users, for specific conditions of use, etc.
Step 3: The system provides the overall listing of business rules across the above items requesting confirmation.
Step 4: The aggregator confirms and the business rules are set. S/he can further edit at any time.

Connected Use Cases: As in Prerequisites. In addition, for all Traveller Use Cases and, in reality, the overall operation of the one-stop-shop, this Use Case is a prerequisite.

Benefits for key actor: The MaaS issuer is able to develop own business policy, taking into account the restrictions imposed by the service providers and upon the negotiation phase with them, and, most importantly, to deploy incentivisation and rewarding strategies based on prime objective (i.e. increase of profitability or socially responsible travellers’ behavior).

Alternatives & extensions: Whether the MaaS issuer of a single location will be able to edit the business rules for mobility products of other locations’ MaaS issuers, when those are sold by its one-stop-shop, will be further investigated in WP7 of the project.

Prioritisation & discussion:

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**Justification:** The overall business rules editor is a tool that is essential for the overall governance of the one-stop-shop. The business rules editor ensures equity principles for all the participating (mobility) service providers, whereas is expected to influence travellers' behavior and synthesis of advanced mobility services.

**Justification:** Prioritisation as emerging from Pan-European workshop outcomes (Table 9).

**Justification:** Though the workshop experts did not rate it as an essential UC, the Consortium considers that it should be high-priority for implementation and demonstration (at least in the real life trials of the 2nd round), as is a necessary back-end mechanism for the operation of the one-stop-shop that the experts were not able to perceive.

Concerns & Risks: The key concern here is how the overall business rules policy defined by the MaaS aggregator will assure the equity between the various services.
**Starting point/background & Innovation in MyCorridor:** Relevant tools and mechanisms for defining overall business rules policy for services have been developed by CERTH/ITI in the previous project S-CASE — Scaffolding Scalable Software Services (2013: Pervasive and Trusted Network and Service Infrastructures) ([https://www.iti.gr/iti/projects/S-CASE.html](https://www.iti.gr/iti/projects/S-CASE.html)). The innovation here is on the way that the defined overall business rules policy will assure the equity between the service providers.

**12.3.3.2 B2 - Added value synthetic**

**Use Case functional description:** The MaaS Aggregator will be able to combine different individual Mobility Products and compose synthetic products/services that will be provided/proposed to the traveller as a single product/service. For example, a parking availability information service can be combined with trip planning in order to prompt a traveller to plan a trip without using a private car in case s/he wants to go to a place where there are no parking lots available. In addition, parking products and vehicle sharing products in the same area can also be bundled in a useful synthetic service that may provided under specific advantageous conditions (i.e. on discount). This type of Mobility Products will be tagged differently in the services repository (i.e. "synthetic products"). The selection of the services that will be combined should be in compliance with the business rules that apply.

**Lead Partner responsible:** Wings

**Other Partners involved:** CERTH/ITI

**Relevant WP/Activity:** WP4/ A4.4: "Added value services" & WP3/A3.1: "Service delivery platform"

**Technologies used:** The Java programming language and the Python Eve REST API framework will be used for the creation of web service compositions form individual services.

**Prerequisites/Dependencies/Restrictions:** The UCs S1 - Service provider log-in and S2 - Service registration are prerequisites for this Use Case, in order to have available registered services available that can be bundled and produce a new synthesized service/product. Also, UC B1 – Overall Business Rules editing and UC S3 - Service provider business rules editing are prerequisites too, as they are defining the key principles and restrictions for feasible service composition.

**Indicative interaction flow scenario:**
Step 1: The MaaS aggregator logs in the system.
Step 2: The Administrator authenticates the aggregator.
Step 3: The MaaS aggregator selects the services to wish to combine.
Step 4: The system confirms (or not) if the suggested service composition is feasible (on the basis of the business rules of B1).
Step 5: Upon confirmation by the system, the MaaS aggregator further edits the business rules that will be applied.
Step 6: The system confirms the validity of the further edited rules.
Step 7: The aggregator confirms and sets the new recommended synthetic services.
Step 8: The Administrator receives the selected services and the business rules and adds them to the workflow of services/products that travellers can select from (the above are also a valuable basis for the MaaS aggregator to formulate the packages of T3.3).

**Connected Use Cases:** As in Prerequisites. The output of this influences the core workflow for the traveller in T3 (is of special value for T3.3 packages as well).
**Benefits for key actor:** Through this Use Case (function), the travellers will benefit, in the sense that they will be provided with the option to use synthetic products/services that may be advantageous for them in several senses and improve their user experience. In addition, the participating service providers may benefit from an increased use of their service, as the combination with other services may prove to be more useful and wanted. The MaaS aggregator will have a valuable basis for formulating the packages of T3.3.

**Alternatives & extensions:** The Administrator may coincide with the MaaS Aggregator depending the business model.

**Prioritisation & discussion:**

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**Justification:** This Use Case should be considered as secondary for the overall one-stop-shop operation and the optimum final product delivery because the important part is to provide available individual services that travellers can use. The composition and the provision of a more complex synthetic products/services from different individual services is a functionality that can improve the overall user experience but is not considered a vital one.

**Justification:** Prioritisation as emerging from Pan-European workshop outcomes (Table 9).

**Justification:** Indeed, this Use Case is considered Secondary, as it does not influence at all the operation of the core mechanisms of the one-stop-shop; it just works on top of them aiming to offer an improved user experience.

**Concerns & Risks:** The main concern here is the availability and the number of services/products that can be interconnected (in a valuable way for the traveller). The composition of a more complex service from individual ones should make sense to the traveller, therefore there must be a logical coherence among the services to be connected. Also, the synthesis of those services must be allowed by the business rules that apply.

**Starting point/background & Innovation in MyCorridor:** Towards this UC, WINGS will leverage expertise stemming from a number of EU R&D projects, such as H2020 iKaaS – intelligent Knowledge as a Service (http://ikaas.com) and KaaS_SCL, an extension of the iKaaS platform that was among the winners of the H2020 FIESTA-IoT 3rd Open Call. In the scope of the aforementioned projects, WINGS delivered, among others, a mobile application that provided personalised services to the user, including optimal routing within the city taking into consideration medical conditions (e.g., allergies or mobility-related disabilities), traffic status and weather conditions, as well as various user preferences, in general. CERTH/ITI also has experience in the field of web service composition. In particular, in the
context of the FP7 European project S-CASE – Scaffolding Scalable Software Services (https://www.it.gr/iti/projects/S-CASE.html) [44], CERTH/ITI designed, implemented and delivered a module for creating web service composition either manually or from Storyboard diagrams. The innovative aspect aimed herein is the provision of synthetic and more sophisticated services to the users aiming to level up their user experience in the one-stop-shop.

12.3.3.3 B3 – Clearance with the traveller and the service providers (e-vouchers)

**Use Case functional description:** As already anticipated in T3, the traveller will be able to purchase Mobility Products. Upon the purchase, the system will provide e-money vouchers as receipts of the payment. For this to happen, another, very significant, process that is taking place in the back-end is the clearance with the involved service providers whose products are to be purchased by the traveller.

As soon as the order comes from the traveller, the Payment Module of the system will distribute the vouchers to the employed service providers, and, after the order is completed, it will perform the money transfers to them. The procurement depends on the specific B2B agreements made between the MaaS aggregator and the service providers.

**Lead Partner responsible:** VivaWallet

**Other Partners involved:** CERTH/ITI for integration in the one-stop-shop & service providers (internal and external to the project) for the realization/simulation of the clearance between the one-stop-shop and the service providers.

**Relevant WP/Activity:** This Use Case will be implemented in the context of WP3/ A3.5: “Mobility tokens and e-payment services”. The integration in the one-stop-shop will be performed in A3.1: “Service delivery platform”.

**Technologies used:** This Use Case will be implemented by the Payment module, which will be developed using the Java programming language. The corresponding Integrated Development Environment (IDE) will be Eclipse Oxygen.

**Prerequisites/Dependencies/Restrictions:** T1 and T3 are prerequisites. The same is valid for S1-S3 and B1. As in all cases, the traveller should have a device supporting Android or iOS and a network connection available for the interaction part and the completion of the payment. Also, the service providers must be registered and add their services in Viva payment system.

**Indicative interaction flow scenarios:**
This Use Case is an elaboration of the back-end processes that are occurring upon the traveller order for payment (see T3).

**B3.1 - E-vouchers creation and issue**

Step 1 (step of T3): The traveller proceeds with the payment and denotes willingness to pay.

Step 2: An e-voucher is created by the Payment Module (operated by the Payment Facility) containing the total cost along with separate cost of each individual Mobility Product of the MaaS package and the payout way that is eligible (i.e. payout to card, payout to IBAN, etc.)

Step 3: The Payment Module presents the created e-voucher to the traveller and asks for consent to proceed with payment.

Step 4: The traveller gives consent for the next step.

Step 5: The Payment Module issues corresponding e-vouchers for each employed service provider and distributes to them asking for their consent.
Step 6: The service providers give consent.
Step 7: The system asks the traveller to select payment method and proceed with the completion of the task.
Step 8 (step of T3): The traveller (through pushed successive steps) selects way of payment, enters his/her e-wallet id and confirms payment.
Step 9: The system confirms successful payment transaction and returns an e-voucher (payment receipt/invoice) to the traveller.
Step 10: Money is (automatically) transferred from traveller’s digital wallet to the Payment Module.
Step 11: The Payment Module redeems these vouchers to transfer the money to the employed service providers.

B3.2 - E-money voucher cancellation
The steps below follow after Step 11 above.
Step 10: Within 24 hours from the creation and issue of the e-voucher, the traveller decides not to make use of it and submits a request to cancel it.
Step 11: The e-voucher is cancelled and the traveller is acknowledged.
Step 12: The system cancels the corresponding e-vouchers of the service providers and acknowledges them of the cancellation. In that case, the whole amount will be returned back from the service providers to the traveller’s bank account.

Connected Use Cases: As in Prerequisites field. This Use Case is also connected to B4 dealing with Mobility Tokens issue and redemption.

Benefits for key actor: This Use Case reflects a mandatory and typical process in all digital interactions with e-shops. It provides security to the traveller as s/he is provided with an e-voucher that serves as a receipt of payment. The key actors here are the Payment Facility (may coincide or not with the MaaS aggregator) and the traveller. The beneficial and innovative part here is that the e-voucher will concentrate the receipts for all Mobility Products constituting the whole MaaS package purchased by the user. The traveller will be able to purchase all the services s/he wants to use through a single endpoint, without having to visit multiple websites and pay for these services separately. Thus, the effort and time required by the traveller for the overall payment process is significantly reduced. In a similar way, the service providers are provided with the necessary e-vouchers corresponding to their Mobility Products.

Alternatives & extensions: It might be the case throughout the progress of the project that the e-money voucher provided to the traveller will be combined with the Mobility Token (of B4 Use Case). Still, originally, those are two different elements in first place. Furthermore, an alternative way of transferring money to the employed service providers, instead of vouchers, would be to use codes, encrypted and unique for each transaction. Additionally, there might be the case that the e-voucher might be paid upon redemption.

Prioritisation & discussion:

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Justification: This UC is a mandatory and typical process that is required in all e-shops.

Justification: Prioritisation as emerging from Pan-European workshop outcomes (Table 9).

As justified in the next columns.
Concerns & Risks: The most important risks concerning payment services are the security and the integrity of the data, which must be guaranteed.

MyCorridor must pay particular attention to all applicable financial services laws and regulations. Online platforms which provide services to facilitate payments may be regulated from an EU level in relation to these payments. For example, it is possible that MaaS models, including MyCorridor, will fall within the scope of the EU’s Payment Services Directive 2 ("PSD2"). If a platform does fall within the scope of PSD2, there will also be authorisation requirements and on-going compliance burdens. That said, there are exclusions which certain platforms may be able to benefit from if within the scope of PSD2; however, this will depend on the corporate structure and the payment flow within the specific MaaS platform. Possible exclusions include: the Limitation Network Exclusion; the Commercial Agent Exclusion; and the Electronic Communications Exclusion. It is important to note that should an exclusion apply, there may be notification requirements to the relevant regulatory body, before the platform can benefit from that exclusion. Further, whilst the Commercial Agent Exclusion could apply to a MaaS platform this exclusion has recently been narrowed under PSD2 ostensibly to capture online market places.

PSD2 is intended to harmonise payments law across the EU; however, national regulators may interpret PSD2 differently and therefore consideration must also be given to the location of the relevant MaaS entity.

Starting point/background & Innovation in MyCorridor: The interface between payment module and MyCorridor will be implemented using Viva’s existing API that creates pre-paid coupons with the desired properties. The innovative part brought in MyCorridor lies in the fact that the traveller will be able to purchase all the services s/he wants to use through a single endpoint, without having to visit multiple websites and pay for these services separately. Thus, the effort and time required by the traveller for the overall payment process is significantly reduced.

12.3.3.4 B4 – Mobility Token Issue and redemption (use/validation)

This Use Case, that as mentioned may be combined with the B3 at the end, refers to the Mobility Token that is finally provided to the traveller, along with e-voucher. It concentrates all smart characteristics that define their eligibility for the redemption of the MaaS package purchased by the traveller at the various operators. This Use Case lists the back-office operations taking place between the aggregator and the engaged service providers in order to allow redemption of the Mobility Tokens.

Lead Partners responsible: VivaWallet (for the Mobility Tokens issue) and AMCO (for the back-office synergies)

Other Partners involved: CERTH/ITI for integration in the one-stop-shop & service providers (internal and external to the project) for the redemption part (and the back-office synergies demonstration).

Relevant WP/Activity: This Use Case will be implemented in the context of WP3/ A3.5: “Mobility tokens and e-payment services" & A3.6: “Towards EURO-Mobility ticket". The integration in the one-stop-shop will be performed in A3.1: “Service delivery platform”.

Technologies used: The connection between MyCorridor and the back-office systems of the mobility service providers will be implemented using web services (JSON data format). The required HTTP(s) requests will be implemented in the back-end using the Python Eve REST framework.

Prerequisites/Dependencies/Restrictions: T1 and T3 are prerequisites. The same is valid for S1-S3, B1 and B3. As in all cases, the traveller should have a device supporting Android or iOS and a network.
connection available for the interaction part and the completion of the payment. Also, the service providers must be registered and add their services in Viva payment system.

**Indicative interaction flow scenarios:**
*This Use Case runs in parallel with the clearance process of B3. As aforementioned, it may be combined.*

Step 1 (step of T3): The traveller proceeds with the payment and denotes willingness to pay.

Step 2: Along with the e-voucher created for the user containing the total cost along with separate cost of each individual Mobility Product of the MaaS package, a Mobility Token for the MaaS package is created and presented to the traveller that contains, in addition, all the eligibility and redemption characteristics of each of the MaaS package Product included such as (list is not exhaustive and will be revisited in A3.5):
- the starting and expiration date for the redemption per each Mobility Product – specific time-slots eligibility (days, hours of day, etc. – can reach the level of detail that is supported by each Mobility Product);
- currency
- quantity per type of Mobility Product purchased
- geography-related parameters (geologation)
- any restrictions for redemption (concerning specific sectors/merchant categories redemption can happen, days in the week/month redemption is allowed, etc.)
- QR code or other product necessary for the redemption of each Mobility Product of the package

Step 3: The Payment Module provides the created Mobility Token to the traveller and asks for consent to proceed with payment (parallel to Step 3 of B3.1).

Step 4: The traveller gives consent for the next step (parallel to Step 4 of B3.1).

Step 5: The Payment Module sends the new Mobility Tokens to all the back-office systems of the mobility service providers for validation (parallel to Step 5 of B3.1).

Step 6: The mobility service providers (parallel to Step 6 of B3.1):
- Add them in their respective "white list";
- Check the validity of them;
- Acknowledge successful registration and readiness for redemption back to the system.

Step 7: The system asks the traveller to select payment method and proceed with the completion of the task.

*Same steps as in B3 continue from this point onward.*

**Connected Use Cases:** As in Prerequisites field. Strong connection with B3.

**Benefits for key actor:** The key actors here are again the Payment Facility that operates the Payment module and the travellers. The benefit for the traveller herein sums up in reality the overall value of the MaaS concept. The notion of the Mobility Token that is a single element aggregating all different Mobility Products purchased by the traveller, providing detailed info for their eligibility and redemption, making this feasible without any further action required on behalf of the traveller is the most innovative element of MaaS and MyCorridor in specific, as, among other, it reflects the validated B2B interactions occurring in the back-end.

**Alternatives & extensions:** One of the alternative workflows takes place if the mobility service providers acknowledge non-successful registration of the Mobility Tokens during back-office validation. In that case, new loops of interaction with the system are triggered until successful registration in the back-offices is achieved. In case this is not possible for any of the Mobility Products, the service providers acknowledge the system and, in turn, the system acknowledges the traveller.

**Prioritisation & discussion:**
Table 38: B4 UC Prioritisation.

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**Justification:** Absolutely essential UC that summarises the key output and benefit of the MaaS platform to the traveller.

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**Justification:** Prioritisation as emerging from Pan-European workshop outcomes (Table 9).

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</table>

**Concerns & Risks:** The most important risks concerning payment services are the security and the integrity of the data, which must be guaranteed.

**Starting point/background & Innovation in MyCorridor:** The interface between payment module and MyCorridor will be implemented using Viva’s existing API that creates pre-paid coupons with the desired properties. The interface between payment module and the underlying back-office systems of the service providers will be implemented using the web services provided by the back-office systems. The innovative part is that the traveller will be able to receive all the Mobility Tokens in a single transaction and not by purchasing each of them separately. Thus, the effort and time required by the traveller for the overall process is significantly reduced.

**12.3.3.5 B5 – Interactive Traffic Management Plan**

This Use Case refers to the interaction and cooperation of different actors involved in the interactive Traffic Management Plan deployment though the TM2.0 framework implementation in MyCorridor project. In the past, traffic management (TM) was mostly one way directed. A road authority informed drivers on its traffic management measures or plans (TMPs) via VMS or other dynamic signaling. Adopting the TM2.0 concept, MyCorridor is a new stage in the development of traffic management, where TMPs can be also provided by mobility service providers and travellers become entirely part of the data supply chain. Traffic Management ensures quality of (car) travel by minimizing travel times and accident's risk. As such could be included in the MaaS suite of services. This Use Case lists the back-office interactions taking place along the entire traffic management chain to provide interactive traffic management plans to the travellers. We can identify the following key actors: Content providers, Infrastructure Managers (Traffic Management Operators), Service providers, MaaS aggregators and travellers. The traveller will be able to use enhanced Traffic Management services (i.e. TM2.0) in his/her vehicle. The relevant Traveller (driver) UCs are included in T3 (also in T7) as a sub-category for TM2.0.

**Lead Partner responsible:** SWARCO (for Traffic Management Central platform)

**Other Partners involved:** TomTom for traffic data providers, CERTH/ITI for integration in the one-stop-shop & service providers (internal and external to the project) for the redemption part (and the back-office synergies demonstration), MAPtm and Salzburg Research for covering multiple roles in the respective pilots value chain.

**Relevant WP/Activity:** This Use Case will be implemented in the context of WP4/ A4.1: "Traffic Management Services". The integration in the one-stop-shop will be performed in A3.1: “Service delivery platform”. The concept of the interactive traffic management plan is conceived in A2.1: “Towards TM2.1”.

**Technologies used:** The connection between MyCorridor and the back-office systems of the Infrastructure Managers (Traffic Management Operators) will be implemented using web services (JSON data format). The required HTTP(s) requests will be implemented in the back-end using REST
framework. The traffic data from TomTom will be acquired using FCD in XML/DATEX2 and TMC/OPENLR for geo-localization ones.

**Prerequisites/Dependencies/Restrictions:** Wireless connection in vehicle and TM2.0 agreements between traffic management centres and navigation service providers.

**Indicative interaction flow scenario:**
Step 1: Infrastructure Managers (Traffic Management Operators) have access to various real-time traffic data (travel time, speed, traffic flow, vehicle account) which are acquired directly by road sensors or by FCD (TomTom).
Step 2: Infrastructure Managers (Traffic Management Operators) collect information about scheduled events by Road Operators and Municipalities
Step 3: All the traffic data collected by different integrated sources at step 1 and 2 are stored, processed, integrated and validated.
Step 4: By step3, Traffic Control Centres generate post processed traffic data, such as: forecast travel time estimation, forecast level of services, current level of services, current travel time, as well as traffic light forecasts.
Step 5: Thanks to the information at Step 3 and 4, Infrastructure Managers (Traffic Management Operators) define interactive Traffic Management measures to optimize the traffic low network, such as: alternative route guidance, open/close preferred lanes, road speed limits.
Step 6: All the data elaborated at step 3, 4 and 5 are provided to the MyCorridor platform for mobility service provision to travellers as well as to 3rd service providers. The Infrastructure Managers (Traffic Management Operators) could indicate a capacity drop within their network which they cannot solve with only TM measures. Thus, the respective Infrastructure Manager asks the MaaS operator to switch travel demand onto a different travel mode or modes provided by the SP’s based in capacity and pricing, with respect to the users business role in order to avoid the capacity drop that the Infrastructure Manager (Traffic Management Operator) has with the ultimate goal to get the user from a to b.
Step 7: The Infrastructure Managers (Traffic Management operators) publish information generated in previous steps to MyCorridor platform for use by C-ITS applications on board.
Step 8: Infrastructure Managers (Traffic Management operators) provide scheduled event information to service providers (e.g. TomTom). The schedule events are integrated into the SP’s services and taken in consideration for more accurate route calculation. The TomTom feed could be available to MyCorridor platform for use by the traveller via the one stop shop (UC T3).
Step 9: Thanks to the implementation of the step 6, 7 and 8 (combined with traditional TM methods such as VMS), the traveller reaches his/her destination. While driving the traveller experiences dynamic navigation service via the device, which includes enhanced traffic management related information such as real time traffic management information & events, zone access control, speed recommendations, in vehicle signage as well as C-ITS services such as GLOSA (See UC T3 description).

**Connected Use Cases:** This use case relates to T3, S1, S2, S3, B1, B2.

**Benefits for key actor:** Multiple benefits can be identified for the key traffic management plan actors, on one side, the Infrastructure Managers can acquire real-time traffic data without any investments in infrastructure (e.g. purchase of road sensors, installation and maintenance) as well as use capacity in other transport systems to spread travel demand, on the another side, content/service providers and MaaS aggregators can enrich their mobility service suite with more contents and so, more services. Finally, the traveller acquires enhanced quality of road use service (i.e. less time, increased comfort, less anxiety, less accidents).

**Alternatives & extensions:** One of the alternative workflows is that TomTom will directly offer data/services to a 3rd party/service provider; this 3rd party can offer just a simple service such as the
dynamic routing (and/or traffic etc) via an API by TomTom, or enhanced TM2.0 services as well as other traffic management related services of its own.

Possible future extension:
- TomTom to integrate traffic management plans in the future.
- The dynamic routing could take into account traffic management restrictions.

Last but not least, MyCorridor should explore the possibility to include the SOCRATES use cases in the future, especially the following ones:
1) Use Case Smart routing – which is a network optimalization use case aiming for near perfect demand distribution throughout the network (asphalt, no other modes). This includes for example dynamic tolling.
2) Use Case Smart destination – which is aimed at the last mile optimalisation around event locations (e.g. optimal uses of all parking locations).
3) Local Information and Hazardous Warning - Areal and Environmental constrains (e.g. Environmental zoning in cities but also aimed at avoiding certain busy areas in the network due to events > related to Smart Routing).

Prioritisation & discussion:

Table 39: B5 UC prioritisation.

<table>
<thead>
<tr>
<th>From Consortium point of view &amp; Final (aggregated) prioritisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ Essential ☐ Secondary</td>
</tr>
</tbody>
</table>

**Justification:** This is one of the main MyCorridor service offered to the customer and clear diversification of our product. It has emerged as an additional Use Case that was not validated during the workshop.

**Concerns & Risks:** The connection with MyCorridor authentication may be an issue if TomTom PNDs are used.

**Starting point/background & Innovation in MyCorridor:** TM2.0 Consortium

13 MyCorridor One-Stop-Shop Services Inventory

The following tables present the current principles that have been adopted for MyCorridor services clustering. The first table provided in Annex 6 provides the abstract detailed clustering for MyCorridor services and the second table lists the matching of the currently identified MyCorridor specific services to it.

Table 40: MyCorridor products & services – key definitions.

<table>
<thead>
<tr>
<th>Type</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility products</td>
<td>Real life, physical transportation services or transportation management</td>
</tr>
<tr>
<td></td>
<td>provided by private/public/public-private transport companies/authorities;</td>
</tr>
<tr>
<td></td>
<td>they might be sold to travellers in the form of ticket products, which are</td>
</tr>
<tr>
<td></td>
<td>based on tariff policy. <strong>Infomobility</strong> and <strong>Added-Value services</strong> are not</td>
</tr>
<tr>
<td></td>
<td>conceived as**</td>
</tr>
<tr>
<td>Type</td>
<td>Definition</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td>Mobility Products, either they are provided upon payment or not.</td>
</tr>
</tbody>
</table>
| **Mobility services cluster:** Services related to the online purchase of *Mobility Products*, which are available for purchase via the MyCorridor one-stop-shop.  
In this cluster, any informatory service part met is because it is part of a Mobility Product. For example, the informatory part of a PT service is clustered here, only if it can finally lead to ticket booking and/or purchase. If it is decoupled and is merely an informatory service (upon payment or not), it belongs to the infomobility services cluster below.  
| **Digital services** which can be provided through MyCorridor one-stop-shop. They are divided in clusters and sub-clusters, as follows below.  
**Vehicle related services:** MyCorridor services supporting purchase of *Mobility Products* for private use of cars (i.e. parking, rental, etc.).  
**Vehicle (car/bike/ecar/ebike/ride) sharing/pooling:** MyCorridor services supporting purchase of sharing/pooling *Mobility Products*.  
**Public transport:** MyCorridor services supporting purchase of Public Transport *Mobility Products* (urban, interurban).  
**Public Transport (Para transit):** MyCorridor services supporting purchase of para transit *Mobility Products* (i.e. taxi services, demand-responsive transport services).  
**Tourist:** Services targeting specifically at tourism.  
**Vehicle related/Public Transport:** Services combining vehicle and PT services (i.e. ferry services).  
| **Traffic management services cluster:** Services related to the online purchase of Traffic Management related *Mobility Products* and/or the use of advanced Traffic Management concepts in the MaaS framework. Can be TM2.0 enabled or not. TM2.0 for MyCorridor stands for the integration of data coming from several sources (i.e. TomTom) feeding the original service.  
| **Advanced traffic management services** (i.e. real time traffic state and forecast, event management, etc.)  
**Access control & Tolling:** MyCorridor services supporting purchase of traffic/demand management products (such as tolls, urban congestion pricing, zone access control).  
**C-ITS enabled traffic management services** (i.e. traffic lights control and forecasting, etc.).  
| **Infomobility services cluster:** Services related to the information and real-time support of the user in *pre-trip phase* (trip planning, support in decision of what *Mobility Product* to purchase), *on-trip phase* (and after *trip phase* if applicable).  
They can be related to *Mobility Products* sold by MyCorridor or for any other mobility service/product not currently supported by MyCorridor. In the latter case, the user just gets information/guidance without the possibility to buy those mobility services.  
| **Multimodal:** MyCorridor service combining multi modal information/route planning/guidance into a single feedback to the user.  
**Public Transport:** MyCorridor services supporting use of Public Transport *Mobility Products*, prior or after their purchase, related to real time info, timetables, etc.  
**Park & Ride:** MyCorridor services supporting use of Park & Ride *Mobility Products* (i.e. real-time information for parking availability and PT estimated time of arrival).  
| **Added Value services cluster:** Services giving added value to the user and enhancing  
| **Touristic/Entertainment:** Services related to supply of touristic/cultural/entertainment information.  
|
This is only the current anticipations and it may change while the project progresses; both the clustering itself as well as the MyCorridor services. So far, there are 64 individual services identified in MyCorridor. Those are either provided by MyCorridor beneficiaries themselves or brought in MyCorridor by them through agreements with other service providers.

Apart from them, MyCorridor aims to attract more external services in order to achieve providing an as much as possible seamless MaaS experience and sound demonstration/validation of the solution that is going to be developed. Those services are aggregated in the one-stop-shop and are provided to the traveller in the context of MaaS packages, either in the form of Mobility Products, or as supportive infomobility and added value services.

Services should not be confused with the one-stop-shop functions that are reflected through the Use Cases of Chapter 12. Still, their availability is required in order to allow the formulation of an actually functional solution that can be demonstrated and evaluated.

This inventory (and in its updated and finalized form), will serve as a pool for the services that will be engaged in the specific Pilot Scenarios of WP6. It will serve also as the starting point for WP4 (MyCorridor MaaS) work, where it will be revisited and enriched.

What is interesting in MyCorridor is the fact that through the B2 UC – Added value synthetic (section 12.3.3.2), further service composition will be supported, tailored to each traveller, creating in this way new sets of services.

It is apparent that the current pool of services cannot support the same experience in all pilot sites. A representative example is the trip planning services that are not equally found in all test sites. Therefore, in the context of WP3 and WP4 of the project, a hybrid trip planner utilising those services and open trip planner data will be built in order to allow a seamless experience in this regard. Another example concerns PT real time information services that are also not found in all sites.

As such, it is vital for MyCorridor 1) to proceed with the planned agreements with the identified service providers 2) to identify more external services to bring in and, especially, in those fields that there are unequally or unsufficiently represented 3) to carefully design pilot scenarios that will be effectively engage existing services achieving at the same time to validate the MaaS concept.

## 14 Conclusions

The current Deliverable (D1.1) has achieved to set all the theoretical basis for the work to follow in the next WPs of MyCorridor project. In specific, it has reviewed and discussed the State of the Art and the strategic priorities in the field, it has recognised the MaaS value chain ecosystem, it thoroughly discusses the acceptability, view, concerns, priorities, needs and preferences of all the stakeholders involved in its value chain through a user/stakeholder centric approach that encompasses literature surveys, on-line surveys, focus groups and workshops. It has also identified the key barriers and enablers for MaaS and MyCorridor success, the first pool of MyCorridor services that will be integrated in its one-shop-shop and the first list of relevant KPIs, whereas, finally, it has turned into requirements and Use Cases the key
findings of the work conducted in WP1: “Defining a disruptive MaaS culture” matching them with the original anticipations of the project workplan.

As such, 15 prioritised Use Cases are described in the current Deliverable that are going to guide the specifications (WP2), implementation (WP3 and WP5) and evaluation work (WP6) of the project. The Use Cases reflect all the functions of the one-stop-shop that will be developed in MyCorridor and will be the key tangible outcome of the project. The updates and revisions that will occur in the Use Cases will be reflected from now onwards in the Use Case guide of the project that will be a separate document that will be also published (part of it) through the project web site. Also, future changes will be also reflected inevitably in the system architecture Deliverable (D2.2).

Apart from the Use Cases, there are some side findings contained in the current Deliverable that are very important for other future work items of the project. For example, the current MyCorridor services inventory that is discussed in Chapter 13 and provided in Annex 6 constitutes the first gathering and clustering of the services of MyCorridor beneficiaries that will be aggregated in the one-stop-shop. This is the starting point for the thorough work on services to be held in WP4: “MyCorridor MaaS”. The goal of the project is to attract as many as possible external to MyCorridor services through agreements that will make with service providers so that it will achieve to provide as much as possible sound proof of concept.

In addition, the literature, workshops and surveys conducted are providing valuable input of the market status, the strategic priorities in the field, the emerging business models, the practices that have been applied successfully or not so far (incentives, promotion policies, loyalty schemes) and the key success and failure factors for MaaS deployment and penetration. This work will feed the work to be realised in the context of WP7: ”Business models, incentives and legal issues” and the exploitation part of WP8: “Dissemination, Exploitation and Policy Issues”, whilst part of it will help towards defining the reference case for the pilot plans in WP6: ”Pilot realization and impact assessment”. Finally, the KPI’s recognised set the basis for the impact assessment framework of WP6.

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Annex 1: Focus Group Briefing Document for Facilitators

MyCorridor WP1 Focus Groups

Focus Group Briefing Document for Facilitators

Background

As part of the MyCorridor project, we proposed to carry out 6 focus groups with potential end users, in different countries, in order to gather data about the public acceptability of MaaS. The intention is to explore this for different kinds of ‘ordinary’ user, who may have quite different patterns of travel (e.g. global, national and/or local), or contexts (e.g. rural/urban), or circumstances (e.g. income, family dynamics) that will influence their experiences of travel, and hence their attitudes towards change.

The aim of the focus group is to discuss how acceptable the ideas behind MaaS are to the public (i.e. concepts such as sharing transport instead of owning it, having a subscription and different ways of paying, and privacy and security). The focus groups will concentrate on the specific factors that might influence acceptance, and help us to ascertain whether the current user profiles are valid or need adjusting. General scenarios will enable participants to understand the idea of MaaS (as they may have no prior knowledge) and enable them to start talking. Prompt questions will be used where needed to explore the concepts.

In addition, it is proposed to include a question towards the very end of the session such as ‘After your participation in this focus group, now knowing what you know about the concept of MaaS, who would consider in the future giving up car ownership in favour of adopting the MaaS concept’ and simply ask for a show of hands response. This can be recorded and used as a qualitative feedback from the group once they have a better understanding of what MaaS is and how it could work for them, rather than using a specific question with Likert response to establish quantitative result.

What is a focus group?

A focus group is a qualitative research method that aims to investigate understandings, feelings, views and experiences in a group setting by bringing together a small group of people to discuss a particular topic. It is facilitated by a researcher who can guide the questions discussed, but the aim is to engage the participants in talking to each other, comparing and contrasting different opinions, leading to a general view about areas of consensus and areas of difference.

What do I have to do?
Each partner is asked to plan, organise and carry out a focus group. The focus group should be conducted according to the instructions and schedule outlined herein. The focus group is likely to take place in the accepted language of each country, rather than in English, and should be audio-recorded. Following the focus group, the partner will be responsible for the translation (to English) and transcription of the audio recording and sending it as an ‘Office Word’ document to Newcastle in order to be analysed. Partners will not be expected to analyse the data.

Planning the focus groups

Venue

A venue should be chosen that is pleasant to be in (i.e. with outside windows) and easily accessible by all, including those with a disability. It is recommended that refreshments are provided, and ensure there are enough chairs for all participants. If you are booking a venue for a particular amount of time, ensure that you leave enough time in the booking for setting up the focus group, and for tidying up afterwards. About half an hour either side of the actual time of the focus group is usually sufficient.

Facilitation

One person from the MyCorridor team should be nominated as the official facilitator of the focus group and will be responsible for the effective organisation and delivery of the group. They will ensure that participants are briefed about what is going to happen, that they have completed the participant information sheet, and that they have given written informed consent. The facilitator is also responsible for setting ground rules, asking questions and prompting discussion, ensuring everyone is able to participate and that the group keep to time. You may wish to have someone with you who can help, particularly with greeting and registering participants, ensuring refreshments are available, and timekeeping.

Recruitment

The focus group should contain between 6 and 12 participants. Due to drop-out and people just not turning up without warning you, you may need to invite more than this (say, 15-20) to make sure you have a group of say 8 to work with. There are several categories within which to target including:

- The commuter
- The tourist
- Businessman
- The spontaneous user
- Mobility restricted user
- Low/Medium IT literacy user

You should also aim for a good gender mix, different ages and income levels where possible. A participant may fit in to more than one of these categories. You may wish to offer to pay for people’s transport costs to travel to the focus group otherwise only those that can afford it can attend. You may wish to give people a shop token for say €15-20 for taking part.

As part of the recruitment process, we ask that an information sheet for participants is completed by them in advance, or at the start of, the focus group. You may translate this if you are using a language other than English. This is to ensure that we know which categories the participants may be part of. Please ensure that the information sheets are coded as participant 1, participant 2, etc., and that these same codes are used to identify participants in the transcription of the audio file. The information sheet can be found below.
**Length**

It is anticipated that the focus group may last between 1 and 2 hours. It is not recommended to last longer than 2 hours.

**Ground rules**

At the start of a focus group, it is helpful to agree some general conversational rules to guide the discussion and enable everyone to participate. These might include, for example:

- Look after yourself – don't say things if you are not prepared to discuss them further in the group. You may prefer to keep some elements of your personal experience private.
- Look after each other – listen to and respect each other’s point of view, even if you disagree. Feel free to challenge another opinion but do it in a polite and respectful manner.
- Look after the group – enable others to take turns to speak. Try not to interrupt or speak over someone else. Raised voices are not acceptable and can be intimidating.

**Consent Procedures and ethics**

Each participant should be given a participant briefing sheet that explains what the focus group is about, and what is going to happen. This can be given to participants in advance, and then again on the day of the focus group to remind them. The consent form which should be completed by every participant. The consent process will cover elements such as:

- Understanding what the focus group is about
- Understanding what will happen to the data
- Understanding how to withdraw consent
- Where and how to get further information
- How to make a complaint
- Confidentiality
- Recording
- How the results will be used

Consent procedures have been developed in line with the guidelines in the ethical report drawn up for the project (MyCorridor D9.2) and the current data management plan (MyCorridor D2.1).

The focus group should be carried out in an ethical manner. Values of equity, respect and honesty are paramount, and facilitators need to be aware of circumstances in which they may decide to ‘protect’ a participant (e.g. from over disclosure, or in the event of conflict). It is useful to think through what situations might arise in advance of the focus group.

**Carrying out the focus group**

**Recording**

The interviews will need to be audio recorded. It is sometimes a good idea to have a back-up recorder just in case, but always check the equipment in advance. It is often a good idea to frequently use participants names, so that they can be identified on the recording afterwards (although of course their names will be substituted with their code before the file is sent to Newcastle).

**The interview**

The participants of the focus group are likely to be ordinary members of the public, who know little about MaaS and may not have thought deeply about their transport experiences before. They may have
varying levels of literacy and understanding of what the project proposes. We therefore suggest the use of scenarios (similar to the tale of Panos and Maria on p.9, part B of the DoA). These scenarios will enable participants to understand a range of options or possibilities, and compare these to their own experiences. These scenarios will be read to the group, and a series of prompt questions used to encourage conversation between the participants.

There are a number of topics of interest, such as:

- Human experience (of MaaS and of travel generally) – their feelings, levels of comfort, confidence, skills
- Conceptual – how are the concepts and ideas behind MaaS received? (e.g. sharing cars, subscription based services)
- Technological – is the technology useable, acceptable, accessible?
- Legal – do people have concerns about privacy and data sharing, and personal safety

After the focus group

The data from the recording will need to be translated into English and transcribed. Names must be removed and each participant identified with a unique code instead (that matches the basic information we have about them). We will provide a template for the transcription. The transcription will need to be sent to Newcastle – further details will be supplied about how to do this. The transcription will use the exact words uttered by the participants, but we do not need to know about non-verbal communication (e.g. facial expressions or gestures).

Further questions

The researchers working on this aspect of WP1 are Karen Laing and Liz Todd from Newcastle University. The main point of day to day contact for the focus group element of the project will be Karen Laing, Senior Research Associate at Newcastle University. Her email is k.j.c.laing@ncl.ac.uk if you have any questions throughout the process.

The focus group schedule

Introduction:

When participants arrive, you should ensure that the following steps are taken:

- Giving the participants a participant briefing sheet.
- Enabling participants to read and sign the consent forms.
- Asking participants to complete the participant information sheet.
- Providing participants with refreshments.

Beginning the focus group:

It is a good idea to get people to sit in a circular pattern, so that the facilitator can see each participant clearly, and is at an equal distance from each of them. The facilitator should welcome the participants and establish the ground rules of the focus group. It is good practice to allow each participant to introduce themselves. You can explain that the ground rules that might include the following. It is a good idea to read and ask the group if these rules are OK. Allow people to make comments and ask questions:
- Look after yourself – don't say things if you are not prepared to discuss them further in the group. You may prefer to keep some elements of your personal experience private.
- Look after each other – listen to and respect each other’s point of view, even if you disagree. Feel free to challenge another opinion but do it in a polite and respectful manner.
- Look after the group – enable others to take turns to speak. Try not to interrupt or speak over someone else. Raised voices are not acceptable and can be intimidating.

The focus group format:

**Activity One:** Enable participants to ‘warm up’ to speaking, and to focus on the topic of the group.

Ask each person in the group to describe their journey to the focus group, including which transport methods they used:

**Q1** How did you get here today?

**Activity Two:** Enable participants to understand what we mean by Mobility as a Service.

Read out the following statement to participants (you may want to provide it in written form too)

‘Mobility as a service means you access any travel (car, bus, train, underground metro, taxi, coach, tram, bike, planes etc.) through the use of a single card or app on your phone. It means increasingly less ownership for example of cars or bikes. Cars will be shared. You will pay a subscription to access any of these, and the card or app will be valid wherever you go in the country or across different countries. So, no need for different travel cards or multiple tickets in different places’. The app will store information about every journey you take, about where you go, at what time, how you travel and the cost.

**Q2:** How does this kind of transport system sound to you?

**Activity Three:** Providing a practical example to enable participants to focus on the topic using a scenario.

Read out the following scenario to participants (you may want to provide it in written form too). You may want to replace the name with a local alternative. You are likely to need to translate this into the language you are using with the focus group.

**Case study 1**

Jane Howard uses the app on her phone to plan her journey from home to the meeting she has across the city. It's not a journey she is used to. The app shows her several options. They are all different combinations of journeys. One combines walking to the bus stop with a metro journey. Others combine various routes on the metro. Another combines a bus journey with taking a bike for part of the way. And another gives the whole journey by bike. A final one is the whole journey by car. Each take slightly different times. Each involve either 'borrowing' a car or bike – or taking the bus or metro.

She thinks carefully about her day. She thinks about what she will be wearing, when she will leave and how long she needs for the journey, and the amount of exercise she needs to take. If she were disabled, she may also be thinking about her physical or non-physical limitations and this would be a factor in her choice. She decides to take the option of using a shared car. She walks to the car park, then uses her phone to obtain a code for her to unlock it and carry out her journey. She does not have to provide payment details, as she has already paid a subscription fee for this service. Off she goes to her meeting! She leaves the car in a public car park near her
meeting venue and again uses the app on her phone to lock it. The app collects data about her trip, in order to help provide personalised suggestions for travel in the future.

On her way back, she decides to borrow a bicycle instead of using the car, in order to enjoy a bike ride along the canal, and get some exercise.

Q3 In this scenario, Jane Howard has used a borrowed car that is available for others to use also. She does not own a car, because she is able to borrow one. How would you feel about this?

Q4 Jane Howard uses an app on her phone to decide the travel options that are right for her. Would you feel confident using MaaS on a phone app?

• Why?/Why not?

• Would it have made your journey here today easier?

Q5 How might a system like this help or hinder your:

• Job or studies
• Holiday
• Family life
• International travel

Q6 The app is collecting personal information about Jane Howard: about her travel choices, and about her payment method. If you were using MaaS, would you be happy with this?

• Why?/Why not?

Some general prompt questions to ask when appropriate:

Q What kinds of choices would you make? Why would you make those choices?

Q What issues do you foresee if this system was available to you?

  o Positive
  o Negative

Q Would MaaS work for you? Why? Why not? What would help it to work/ work better?

(If this has not previously come up in the conversation ask direct questions about MAAS such as: Would sharing (a car/ a bike) be easy for you/ preferable / difficult or something else?

Would you be prepared to ‘give up’ something to have this service i.e. ownership or a car, of a bike etc.? If so would this be difficult/ easy/ attractive etc.?

What might help or encourage you to use a service like this?

Does the idea of a ‘one stop shop’ appeal to you? Why/why not?

Would not having to make separate payments for different parts of the journey be positive/ have problems for you/ other?
How would you feel about the data that is collected on the app about your journeys? (useful, a concern, etc.)?

If you think of other more direct questions about the specific aspects of MaaS that have not come up in the conversation, ask these questions.

Closing the focus group:

Q7 What was the most important issue we have talked about today?

Q8 Is there anything that we did not talk about that you feel is important? Please use this time to tell us about that.

Q9 After your participation in this focus group, now knowing what you know about the concept of MaaS, who would consider in the future giving up car ownership in favour of adopting the MaaS concept? Please give me a show of hands.

At the end of the focus group

It is good practice to thank participants for their time. You will also need to inform them what will happen to the data, and that they will be sent a copy of the results if they would like them. Remind all participants that they will not be named in written documents about the research.

Participant Briefing Sheet – MyCorridor focus groups

What is this all about?

The MyCorridor project is about bringing new ways to organise travel. It is funded by the European Commission as part of its Horizon 2020 programme, and consists of 17 universities and companies across Europe.

You have been asked to participate in a focus group as part of MyCorridor to talk about your views on a new way of organising travel. A focus group is a discussion with about 6 – 10 other people, including someone who will be asking questions. It will run for up to 2 hours.

Your views will be used to inform the development of ‘Mobility as a Service’. Mobility as a Service has been described like this:

‘Mobility as a service means you access any travel (car, bus, train, underground metro, taxi, coach, tram, bike, planes etc.) through the use of a single card or app on your phone. It means increasingly less ownership for example of cars or bikes. Cars will be shared. You will pay a subscription to access any of these, and the card or app will be valid wherever you go in the country or across different countries. So no need for different travel cards or multiple tickets in different places. The app will store information about every journey you take, about where you go, at what time, how you travel and the cost.’.

The researchers need to know how different people, in different circumstances, feel about this kind of service, and whether it would be something they would want to use in their own lives, perhaps when travelling to work, to study, or on holiday.

Taking part

Taking part in the focus group is voluntary. You do not have to take part. You can withdraw from participating at any time. What people say during the focus groups will be written about in a report and
other articles, but your name and other personal information about you will not be shared or used in any way, and no-one will know who said what. The report will be publicly available and you will be able to request a copy.

**Who is responsible for this study?**

The Lead Researcher is Roberto Palacin, who is based at Newcastle University in the UK. You can contact him at roberto.palacin@newcastle.ac.uk

Alternatively, if you have more questions, you can talk to the person running your focus group.

**Participant Consent Form – MyCorridor focus groups**

I agree to participate in this focus group being carried out as part of the MyCorridor project. I can confirm that *(please tick each box to indicate you agree)*:

- I confirm that I am aged 18 or over
- I have read and understood the Participant Briefing Sheet and the Participant Information Sheet
- I understand I can ask questions at any point before, during or after the focus group
- I understand that the focus group will be audio recorded
- I understand that the audio will be transcribed (typed up) but that no personally identifiable information will be included
- I understand that the data collected for this will be stored securely
- I understand that the information collected for this study will be used only for research purposes
- I understand that my name and any other information which could personally identify me will not be used on any documents or in any presentations about the research
- I understand that I can leave the study at any time without needing to say why.

Signature of participant: .......................................................... Name (in capitals) ........................................ Date .........................
If you have any questions about this research please feel free to contact:

Name: 
Email: 
Telephone: 

**Participant Information Sheet**

The following information will help us to understand more about you. We would be grateful if you could answer the questions and give this form back to the person who is running your focus group.

Your name: 

**Your age: (please circle one)**

- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 55 and over

**Your gender: (please tick)**

- Male
- Female

**Your employment status (please tick as many as apply to you)**

- Employed full time
- Employed part
- Full time student
- Part time student
- Retired
- Unemployed
- Other (please state)

---------------------------------------------

**Have you taken a holiday in the past year (please tick as many as apply to you)**

- Abroad
- In your own country
Approximately how much is the annual income of your household? (please circle your nearest estimate)

- Under €12,000
- €12,000-24,000
- €25,000-36,000
- €37,000-60,000
- €61,000-90,000
- over €90,000

Are you registered disabled? (please tick one answer)

- Yes
- No

Do you own a car? (please tick one answer)

- Yes
- No

Do you own a bike? (please tick one answer)

- Yes
- No

Do you ever use public transport? (please tick one answer)

- Yes
- No

What is the main method of transport that you use?

- Private car (passenger or driver)
- Walk
- Train/bus/metro
- Motorbike/moped/scooter
- Bike
- Taxi
- Other (specify) ____________________

How confident do you feel using a computer? (please circle one answer)

- Very confident
- Confident
- Not very confident

THANK YOU!

Please give this form back to the person running your focus group

Office use only:

Pilot location:

Participant number:
Typical information to assist the development of mobility scenarios

The discourse around mobility as a service (MaaS) continues to expand with contributions from stakeholders, visionaries and academics, but very little is known of the perspective of end users. There have been many attempts to define MaaS with various degrees of success. Prof Corinne Mulley did put it very simply by describing MaaS as:

“A technology-enabled Mobility Management service where the customer interface and business back office are integrated […]. MaaS concentrates on resolving the origin and destination requirements of the traveller through providing (usually) a number of options which vary by mode, time and cost.”

A recent report by Kamargianni et al describes MaaS as a concept that “is built on transport system integration, Internet of Things and sharing economy principles”. The following figure represents the situation with and without MaaS from an end user perspective.

The following two scenarios briefly describe the typical situation being faced today and how a MaaS deployment would affect it. Regardless of the scenario, for MaaS to succeed, a move away from ownership and towards “access-ship”, blurring the boundaries between public and private transport is required.

**Scenario 1_Urban trips**

In metropolitan areas across the globe moving around requires multiple modes, payment types, tickets, planning tools with various degrees of fragmentation and success. Typically, handicaps, also known as pain points, include:

- Lack of clear, readily available information on multimodal journeys e.g. connections between bus and tram/metro;
- Lack of interoperability/validity of journeys using multiple operators;
- Need to acquire physical tickets for several legs of the journey;
- Inconsistency of payment methods e.g. buses not accepting notes or bank cards;
- Lack of clarity on the availability of parking for private transport e.g. bikes, cars at interchanges;

The wider spread deployment of MaaS would address these main points. For instance, the concept of an ecosystem where the MaaS model matches on real time the journey request with the traveller profile and the demand-supply situation will solve issues such as journey planning, integrated payment and ticketing. From a user perspective, the experience would be transformed, turning an often arduous, time consuming and sometimes exhausting process into one that can be completed in very little time (for repetitive travel e.g. commuting, the model learns habits so very little input is needed). In addition, the operational aspects of MaaS e.g. optimisation of supply-demand would be translated into a more fluid journey with no delays.

**Scenario 2_International travel**

The above aspects can, arguably, be exacerbated when visiting a city, this being in the same country or internationally, the former involving compatibility of approaches and the latter roaming. For instance, an OYSTER card is only valid in London. Travelling to other UK cities requires learning the system, how to travel (e.g. ticketing types), payments etc. OYSTER credit and the TFL travel planner don’t work in
Edinburgh. These pain points are equally applicable to international travel e.g. OCTOPUS cannot be used in London and OYSTER cannot be used in Hong Kong.

The ability to have a subscription to mobility that can be used everywhere using a familiar interface in the same way that mobile service packages (no need to have a different contract every time we travel) would transform the user experience as well as allowing the optimisation of transport systems and addressing many of today's challenges e.g. congestion, air quality.

Annex 2: On-line Maas survey

On-line MaaS Survey from MyCorridor project

What is the MyCorridor project?

The MyCorridor project (“Mobility as a Service in a multimodal European cross-border corridor”) is an EU funded project (http://mycorridor.eu/) aiming to facilitate sustainable travel in urban and interurban areas and across borders by replacing vehicle ownership with private vehicle use. The project’s objective is to use Mobility as a Service (“MaaS”), to put users at the core of transport services and offer them tailor-made mobility solutions based on each individual’s needs. The project intends to use MaaS to integrate various forms of transport into a unified mobility platform; accessible via a single app. The MyCorridor consortium includes 16 research partners (“the Research Partners”) across various EU countries and a legal team. For a full list of our Consortium partners, please visit http://mycorridor.eu/partners/.

What is MaaS?

Mobility as a Service (MaaS) has been described like this:

Mobility as a Service (MaaS) is the integration of various forms of transport services into a single mobility service accessible on demand. It aims to enable "a shift away from personally owned modes of transportation and towards mobility solutions that are consumed as a service. This is enabled by combining transportation services from public and private transportation providers through a unified gateway that creates and manages the trip, which users can pay for with a single account”.

What is the purpose of this online questionnaire?

The questionnaire aims to assist the Research Partners to explore the awareness and acceptability of Mobility as a Service (MaaS) and identify the key concerns, user needs, preferences and value propositions regarding mobility, MaaS and MaaS enabling applications.

Who is conducting the research?

The Research Partners will work together to review and process the information you provide.
What type of information will we need to collect from you?

The questionnaire sets out all the information we require from you and the questionnaire is anonymous.

Will my personal information be shared with any third party?

The Research Partners may need to share the results of the aggregated data collected from the questionnaire with the EU Commission or the Innovation and Networks Executive Agency (who assisted with the funding of the MyCorridor project) to assist with the objectives of the questionnaire and developing the MyCorridor project. All personal information will be anonymised prior to it being shared with any third party.

What will happen to any information I give you and how will it be stored?

We will comply with all applicable laws and regulations when it comes to collecting, storing, using and sharing any personal information you provide in the questionnaire. All information is collected anonymously and will remain anonymous when stored on a password protected computer. We will only share your personal information as described above. After we have finished collecting and analysing all data provided and when it is no longer necessary for us to retain your personal information, we shall destroy, as far as reasonably practicable, all such personal information that we hold on you. In any event we shall not hold any of your personal information provided in this questionnaire for longer than three (3) years.

Who should I contact in relation to the questionnaire?

Please contact us for information relating to the questionnaire using the email address provided at the bottom.

What will happen to the results of the questionnaire?

The results from our analysis of the information you and other individuals provide us with via the questionnaire may be used by us, the European Commission and the Innovation and Networks Executive Agency to help us develop the MyCorridor project. Any personal information will remain anonymised.

Researching contact: Dr. Maria Gkemou, mgemou@certh.gr.

Thank you in advance for your valuable feedback.

The MyCorridor Consortium
Profile

1. My age:
   □ 18-24 □ 25-34 □ 35-44 □ 45-54 □ 55-64 □ 65 and over

2. My gender (optional): □ Male □ Female

3. Country (optional): ...........

4. My employment status (please tick as many as apply to you - optional)
   □ Employed full time
   □ Full time student
   □ Retired
   □ Employed part time
   □ Part time student
   □ Unemployed
   □ Other (please state)

5. I have taken a holiday in the past year (please tick as many as apply to you):
   □ Abroad □ In my own country

6. The annual income of my household is approximately (please tick in your nearest estimate - optional)
   □ Under €12,000 □ €12,000-24,000 □ €25,000-36,000 □ €37,000-60,000 □ €61,000-90,000 □ over €90,000

7. I am registered disabled (please tick one answer):
   □ Yes □ No

8. I own a car (please tick one answer):
   □ Yes □ No

9. I own a motorcycle (please tick one answer):
   □ Yes □ No

10. I own a bicycle (please tick one answer):
    □ Yes □ No

11. For local journeys, I use mainly (please tick one answer):
    □ Private car (driver)
    □ Private car (passenger)
    □ Motorbike/moped/scooter
    □ Bike
    □ Taxi
    □ Public transport (Train/bus/metro/air)
    □ Walking
    □ Car sharing/pooling
    □ Other. Please define: ........

12. For my cross-border travels, I use mainly (please tick as many answers as appropriate):
Private car (driver)
Private car (passenger)
Motorbike/moped/scooter
Bicycle
Taxi
Public transport (Train/bus/metro/air)
Walking
Car sharing/pooling
Other: Please define: .......

13. I specifically use public transport (please tick one answer):
   □ Never □ Rarely □ Often □ On a daily basis

14. I rarely or never use public transport because (please specify in case you have answered “Never” or “Rarely” in the previous question; otherwise, skip this question):

15. Are you familiar with mobility schemes like car/ride sharing and carpooling?
   □ Yes □ No

16. Have you used any car/ride sharing or carpooling service before?
   □ Yes □ No

17. If yes, how often?
   □ On a daily basis
   □ On a weekly basis
   □ On a monthly basis
   □ When I travel cross-border
   □ Other, please define: .........

18. I feel ............using a computer (please tick one answer):
   □ very confident □ confident □ not very confident

19. Have you heard of MaaS (Mobility as a Service) before?
   □ Yes □ No

20. If yes, where from (please tick as many as apply to you)?
   □ From press or other types of articles
   □ My work is related to that
   □ The City/Region I live provides MaaS
   □ From “word of mouth”
   □ Other. Please define:.......
Survey

23. What is the most important factor that would convince you to use MaaS?

Please specify: ....

24. How important is each of the following criteria for you when travelling **locally** [please tick in the relevant box: 1 = Not important at all, 5 = Very important]?

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<th>Criterion</th>
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<td>Comfort/Convenience</td>
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<td>Social Interaction (e.g. ride sharing)</td>
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<td>Being friendly to environment</td>
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<td>Other (please define)</td>
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</table>

25. How important is each of the following criteria for you when travelling **cross-border** [please tick in the relevant box: 1 = Not important at all, 5 = Very important]?

<table>
<thead>
<tr>
<th>Criterion</th>
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<td>Being friendly to environment</td>
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<td>Other (please define)</td>
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26. Which are the top 3 traveller profiles that suit you best [please select up to 3 options]?

- The “Daily commuter”
- The “Tourist”
- The “Businessman”
- The “Spontaneous user”
- The “Mobility-restricted user”
- The “Medium IT literate user”
- Other (please define)

27. How willing are you to change your mode of transport if your means of travel were made more efficient overall (in terms of time spent, money saved, etc.) [please tick one answer]?
28. Which of the following information do you think would help a MaaS one-stop-shop to recommend travel options (more than one options are applicable)?

- Traveller behavior (travel habits, preferable transport modes, transport schedules, favorite POI's)
- Mobility or other type of restrictions
- Age
- Gender
- Preferred language for interaction
- Personal interests/hobbies (for added value services)
- Payment method
- Travel criteria (cost, time, comfort)
- Other (please define)

29. Which of the following personal info would you be comfortable sharing with a MaaS one-stop-shop app (more than one options are applicable)?

- Traveller behavior (preferable transport modes, transport schedules, favorite POI's)
- Mobility or other type of restrictions
- Age
- Gender
- Preferred language for interaction
- Personal interests/hobbies (for added value services)
- Payment method
- Travel criteria (cost, time, comfort)
- Other (please define)

30. Please rate each of the following statements [please tick in the relevant box: 1 = Not at all, 5 = Very much]?
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<tbody>
<tr>
<td><strong>Not at all</strong></td>
<td><strong>Very much</strong></td>
<td></td>
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<tr>
<td>traffic incidents, extraordinary traffic measures, etc.) when travelling with a car.</td>
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<tr>
<td>An all-inclusive MaaS one stop shop (for planning, booking and purchasing travel) available as an app through my mobile phone would help my every-day mobility in my city.</td>
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<tr>
<td>An all-inclusive MaaS one stop shop (for planning, booking and purchasing travel) available as an app through my mobile phone would help my every-day mobility for my cross-border travels.</td>
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<td>I feel current transport services available to me are insufficient.</td>
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<td>I would feel insecure using an all inclusive MaaS one stop shop app.</td>
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<td>I would have concerns using mobility schemes that would make me abandon my vehicle.</td>
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<td>Using an all inclusive MaaS one stop shop would encourage me change my transport habits.</td>
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<tr>
<td>Using an all</td>
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</tr>
<tr>
<td><strong>Not at all</strong></td>
<td><strong>Very much</strong></td>
<td>inclusive MaaS one stop shop would encourage me to use Public Transport more often.</td>
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<tr>
<td>Using an all inclusive MaaS one stop shop would encourage me use shared mobility schemes (i.e. car sharing).</td>
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<tr>
<td>I am willing to share my mode of transport with other travellers.</td>
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<tr>
<td>I would feel comfortable sharing other people's vehicles to move around.</td>
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</table>

31. Please select which are in your opinion the most crucial aspects that should be addressed in traveller's interaction with the one-stop-shop through mobile [more than one options are applicable]?

- User Interface friendliness and intuitiveness
- Minimum time spent on the app for a full service cycle (from searching to payment)
- Security of transactions and data protection
- Overall service reliability (the app opens and works)
- Provided info reliability
- Ability to store favorite POI’s and frequent routes in profile
- Significant number of options available (for the same Origin-Destination requests)
- Finances tracking – “MyWallet” (track my spending, savings, etc.)
- Feedback from other users about the options available
- Transaction history storage
- Personalised product (overall service provided meeting your profile and personal needs and preferences)
- Trip planning coupled all along with available options
- Search functionality
- Other. Please define: ......

32. How might a MaaS enabling system/app help or hinder your your daily mobility? Which are the key benefits and drawbacks you can see when using it in this context?

……………………………………………………………………………………………………………………………………..

33. How might a MaaS enabling system/app help or hinder your your cross-border travels? Which are the key benefits and drawbacks you can see when using it in this context?

……………………………………………………………………………………………………………………………………..
34. Please share any further comments you have regarding shifting to a MaaS based world.

You are welcome to join us!

If you want to join the MyCorridor Interest Group and be informed on the progress of the project, please sign-up at: http://mycorridor.eu/interest-group/

Thank you for your participation in our survey!

The MyCorridor Consortium

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 636626.

Annex 3: Workshop Interactive Session Presentation
Topics & Interaction

- MaaS & public sector
- MyCorridor Use Cases
- Business Models
- Towards a Euro-Mobility ticket

How to interact:

Please log-in to menti.com and enter the numeric code

Wifi:
Network: OC Visitor
Password: OCwifiGuest1748

MaaS & public sector

1. How involved should transport authorities be in:
- Integrated platforms for planning, booking & paying for a trip (MaaS app)
- Car – sharing
- Bike – sharing
- Ride – hailing services
- Travel information services (all modes)
- Road traffic management

Rate each one from: ☹️ -2 - +2 😊
MaaS & public sector

2. How can transport authorities best support MaaS (select up to 3)?
   - Contacts/agreements
   - Financial incentives/disincentives
   - Regulation
   - Dialogue
   - No instruments needed
   - Other [please define]

Choose the most applicable one(s) – more than one options applicable

3. MaaS success should be rather (one option):
   - Policy-driven
   - Market-driven

MyCorridor Use Cases

Actors interacting with One-Stop-Shop
(clustered below per way of interaction)

- Travellers (of any type)
- Service providers (Mobility, Infomobility, Content Provider, Technology Provider, CRS, TM2.0)
- MaaS Issuer/Aggregator
- Payment facility
- Government/Authorities/Policy makers – (mainly for business model editing)
MyCorridor Use Cases – For Travellers

1. User Login/Register/Authentication
2. Profile set-up/edit
3. Personalised MaaS product selection and booking (trip planning included as an option)
4. Personalised Info support (added value services – athletic, touristic, cultural, health push personalised information) - Push notifications
5. MaaS Product payment and voucher(s) issue
6. Redemption (use/validation) – Token consumption at Mobility service providers
7. Change/Cancellation
8. Traveller feedback (QoS monitoring)
9. Loyalty scheme/Rewarding

MyCorridor project – D1.1 / MyCorridor Use Cases
MyCorridor Use Cases – For **MaaS Issuer/Aggregator**

1. Matchmaking for MaaS product delivery (for travellers)
2. Overall Business Rules editing
3. Service performance ranking
4. Added value synthetic
5. Multicriteria Search
6. Back office synergies – Euro-Mobility ticket

MyCorridor Use Cases – For **Payment Facility & Service Providers**

**MaaS Payment Facility**
1. E-money voucher to the traveller
2. Clearance - vouchers issue and distribution (to participating service providers)
3. Clearance - vouchers redemption

**Service providers**
1. Service provider log in
2. Service registration
3. Service provider business rules editing
MyCorridor Use Cases – Questions

1. Which traveller profiles should MyCorridor focus on?
   - The “Daily commuter”
   - The “Tourist”
   - The “Businessman”
   - The “Spontaneous user”
   - The “Mobility-restricted user”
   - The “Elderly user” (i.e. medium IT literacy level)
   - Other (please define)

2. 1 Which of the following personal info do you think that are crucial for optimum MaaS product delivery?
   - (Usual) traveller behavior (preferable transport modes, transport schedules, favorite POI’s)
   - Mobility or other type of restrictions
   - Age
   - Gender
   - Nationality (for language settings)
   - Personal interests/hobbies (for added value services)
   - Relevance to most frequently applicable user cluster (tourist, commuter, ...)
   - Payment method
   - Other (please define)

2.2 Which of them would you share without a concern?
MyCorridor Use Cases – Questions

3. Please rate the importance of the following characteristics when selecting MaaS:
   - Cost
   - Time
   - Comfort
   - Reliability
   - Social interaction (e.g., ride sharing)
   - Environmentally friendly
   - Other (please define)

MyCorridor Use Cases – Questions

4. Most important incentives for service providers to join MaaS platform:
   - Increase revenues
   - Preserve business autonomy
   - Clear MaaS business proposition
   - Fair competition
   - Easy to join
   - Security & data protection for own users
   - Provision of feedback on service by the platform

More than one options are applicable
Business Models - Convergence of two trends: TM2.0 & MaaS

**TM2.0**
- TM2.0 ERTICO Platform originated in 2011 from TomTom and Sweco-Mizar and now reaps more than 20 members.
- "Use MaaS as a tool for multimodal demand management" From Road Traffic management and TM2.0 TO Multi modal Management (TM2.1 Framework)
- Aims at improving the total value chain for consistent management and traffic services

**MaaS**
- Mobility products such as public transport, car and bicycle sharing, parking, taxi and paratransit are
  - Use TM 2.0 (TM 2.1) to enrich MaaS product
  - Involve car as part of the product but promote modal shift & Facilitate seamless usage of urban and interurban road
  - Traffic Management ensures quality of [car] travel by minimising travel times and accident’s risk. As such could be included in the MaaS suite of services.
  - Cross border interoperability is required to satisfy the European Traveller’s requirement for mobility

---

**Business architecture: The pillars of MY CORRIDOR ecosystem**

- **My Corridor products** Local bundles of mobility products; Cross border pay-as-you-go; TM2.0 product
- **Channels**
- **Traffic Management**
- **Mobility Services**
- **MaaS Issuer/Aggregator**
- **Infomobility (content) services**
- **Payment facility (mobility tokens)**
Promotion & Socially responsible traveller strategies

Examples of strategies:

- **Incentives**
  - Loyalty scheme
  - Promotion campaigns (for example, if you use park & ride during peak hours you get 3$ voucher)

- **Pricing**
  - Scaling discounts (i.e., the more you use the system the less you pay)
  - Added value services (i.e., combination of mobility services or combination with other products – for example theater tickets – may lead to optimized costs)

- **Taxation**
  - Tax reductions or Urban tolling discounts because of desired travelling behaviour

- **Socially responsible behavior**
  - Calculating CO₂ reductions by Eco driving
  - Comparing environmental benefits because of modal shifts

- **Crowdsourcing rewards**, for example: *Rewards for providing FCD*

Business Models - Questions

1. What is the potential **impact of integrating interactive traffic management (TM2.0) on the success of MaaS**?

   Rate: -2: No impact – +2: Vast impact

2. What is the potential **impact of MaaS deployment on multi modal traffic management**?

   Rate: -2: No impact – +2: Vast impact
Towards a Euro – Mobility ticket

- Through the mobility tokens and e-payment services, users will be able to pay and purchase mobility products, essentially comprising of Mobility Tokens (e-money vouchers).

- Users will be able to use (redeem) their mobility tokens at the different mobility services (regional and urban PT schemes, parking lots, car and bike sharing).

- To do so, the system should produce a "Euro-Mobility Ticket" that will allow users to use a mobility service and service operators to validate that this ticket corresponds to an already paid service.

Towards a Euro – Mobility ticket

1. Which is the main barrier to the development of the Euro Mobility ticket?
   - Technical
   - Commercial
   - Regulatory
   - Other (please define)

2. Is it needed? Yes/No
Annex 4: Post Workshop online feedback form

Post-feedback form

as of MyCorridor 1st Pan-European Workshop “Mobility-as a-Service across borders” - 09.02.18, London, UK

What is the MyCorridor project?
The MyCorridor project ("Mobility as a Service in a multimodal European cross-border corridor") is an EU funded project (http://mycorridor.eu/) aiming to facilitate sustainable travel in urban and interurban areas and across borders by replacing vehicle ownership with private vehicle use. The project's objective is to use Mobility as a Service ("MaaS"), to put users at the core of transport services and offer them tailor-made mobility solutions based on each individual's needs. The project intends to use MaaS to integrate various forms of transport into a unified mobility platform; accessible via a single app. The MyCorridor consortium includes 16 research partners ("the Research Partners") across various EU countries and a legal team. For a full list of our Consortium partners, please visit http://mycorridor.eu/partners/.

What is MaaS?
Mobility as a Service (MaaS) has been described like this:

Mobility as a Service (MaaS) is the integration of various forms of transport services into a single mobility service accessible on demand. It aims to enable "a shift away from personally owned modes of transportation and towards mobility solutions that are consumed as a service. This is enabled by combining transportation services from public and private transportation providers through a unified gateway that creates and manages the trip, which users can pay for with a single account".
What is the purpose of this online questionnaire?
The questionnaire aims to assist the Research Partners to get all essential feedback from experts – as a follow-up of the feedback provided in the context of the 1st Pan-European workshop (09.02.18, London, UK) in order to be able to explore in efficiency the key concerns, stakeholders’ needs, preferences and value propositions regarding mobility, MaaS and MaaS enabling applications, such as the one MyCorridor aims to implement and validate.

Who is conducting the research?
The Research Partners will work together to review and process the information you provide.

What type of information will we need to collect from you?
The questionnaire sets out all the information we require from you and the questionnaire is anonymous.

Will my personal information be shared with any third party?
The Research Partners may need to share the results of the aggregated data collected from the questionnaire with the EU Commission or the Innovation and Networks Executive Agency (who assisted with the funding of the MyCorridor project) to assist with the objectives of the questionnaire and developing the MyCorridor project. All personal information will be anonymised prior to it being shared with any third party.

What will happen to any information I give you and how will it be stored?
We will comply with all applicable laws and regulations when it comes to collecting, storing, using and sharing any personal information you provide in the questionnaire. All information is collected anonymously and will remain anonymous when stored on a password protected computer. We will only share your personal information as described above. After we have finished collecting and analysing all data provided and when it is no longer necessary for us to retain your personal information, we shall destroy, as far as reasonably practicable, all such personal information that we hold on you. In any event we shall not hold any of your personal information provided in this questionnaire for longer than three (3) years.

Who should I contact in relation to the questionnaire?
Please contact us for information relating to the questionnaire using the email address provided at the bottom.

What will happen to the results of the questionnaire?
The results from our analysis of the information you and other individuals provide us with via the questionnaire may be used by us, the European Commission and the Innovation and Networks Executive Agency to help us develop the MyCorridor project. Any personal information will remain anonymised.

Researching contact: Dr. Maria Gkemou, mgemou@certh.gr

Thank you in advance for your valuable feedback.

The MyCorridor Consortium

Profile

My age:

- □ 18-24
- □ 25-34
- □ 35-44
- □ 45-54
- □ 55-64
- □ 65 and over
About MaaS
MaaS enablers and barriers

We have distinguished the following clusters of enablers and barriers in the context of MyCorridor:

- **Human-related**: Related to human attitude to changes and how changes are introduced.
- **Conceptual**: Concerning the adoption and deployment of new concepts.
- **Technological**: Dealing with infrastructure features, availability of tools and technologies.
- **Organisational**: Including aspects on overall interaction among the different entities having common goals and linked to external environment.
- **Business related**: Concerning business impact and models.
- **Legal**: Compliance with international, national and local regulation.

1. Could you please rate (X) the relevance of each identified barrier/enabler [-2 = Lowest relevance, +2 = Highest relevance]?

<table>
<thead>
<tr>
<th>Type</th>
<th>Enablers</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>+1</th>
<th>+2</th>
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<td>Trends supporting MaaS Growth</td>
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<tr>
<td>Conceptual</td>
<td>TM 2.0 Concept (<a href="http://tm20.org/">http://tm20.org/</a>)</td>
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<td>Technological</td>
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<td>MaaS Alliance</td>
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<tr>
<td>Type</td>
<td>Enablers</td>
<td>Stronger cooperation between stakeholders</td>
<td>Smart Ticketing Alliance</td>
<td>Political pressure for change</td>
<td>Public-Private Partnership</td>
<td>Crypto-currency assets</td>
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| Business   | Political pressure for change                                           |                                             |                          |                               |                           |                        |                   |
|------------|--------------------------------------------------------------------------|---------------------------------------------|--------------------------|-------------------------------|---------------------------|------------------------|                   |
| Legal      | Public-Private Partnership                                              |                                             |                          |                               |                           |                        |                   |
|            | Crypto-currency assets                                                   |                                             |                          |                               |                           |                        |                   |
|            | Geo-blocking rules                                                       |                                             |                          |                               |                           |                        |                   |

<p>| Type       | Barriers                                                                 | Lack of user acceptance                    | Limited understanding of user needs | Ambiguous reliability of data exchanged | Limited political acceptance and intervention | New roles for public administrations | New business model acceptance | Unaddressed interoperability and compatibility | Unaddressed security and data management | Need for a (a currently missing) mechanism for open location data | Need for(a currently missing) correct mobile network dimensioning | Lack of stakeholder cooperation |
|------------|--------------------------------------------------------------------------|---------------------------------------------|---------------------------------------|------------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------|-------------------|
| User-Market| Lack of user acceptance                                                  |                                             |                                       |                                          |                                                                                          |                                                                                   |                                                    |                                                        |                                                        |                                                                              |                                                                              |                                               |
| Conceptual | Limited understanding of user needs                                     |                                             |                                       |                                          |                                                                                          |                                                                                   |                                                    |                                                        |                                                        |                                                                              |                                                                              |                                               |
|            | Ambiguous reliability of data exchanged                                  |                                             |                                       |                                          |                                                                                          |                                                                                   |                                                    |                                                        |                                                        |                                                                              |                                                                              |                                               |
|            | Limited political acceptance and intervention                           |                                             |                                       |                                          |                                                                                          |                                                                                   |                                                    |                                                        |                                                        |                                                                              |                                                                              |                                               |
|            | New roles for public administrations                                     |                                             |                                       |                                          |                                                                                          |                                                                                   |                                                    |                                                        |                                                        |                                                                              |                                                                              |                                               |
|            | New business model acceptance                                            |                                             |                                       |                                          |                                                                                          |                                                                                   |                                                    |                                                        |                                                        |                                                                              |                                                                              |                                               |
|            | Unaddressed interoperability and compatibility                           |                                             |                                       |                                          |                                                                                          |                                                                                   |                                                    |                                                        |                                                        |                                                                              |                                                                              |                                               |
|            | Unaddressed security and data management                                 |                                             |                                       |                                          |                                                                                          |                                                                                   |                                                    |                                                        |                                                        |                                                                              |                                                                              |                                               |
| Technological| Need for a (a currently missing) mechanism for open location data        |                                             |                                       |                                          |                                                                                          |                                                                                   |                                                    |                                                        |                                                        |                                                                              |                                                                              |                                               |
|            | Need for(a currently missing) correct mobile network dimensioning        |                                             |                                       |                                          |                                                                                          |                                                                                   |                                                    |                                                        |                                                        |                                                                              |                                                                              |                                               |
|            | Lack of stakeholder cooperation                                          |                                             |                                       |                                          |                                                                                          |                                                                                   |                                                    |                                                        |                                                        |                                                                              |                                                                              |                                               |
| Organisational| Ambiguous availability of skilled staff                                   |                                             |                                       |                                          |                                                                                          |                                                                                   |                                                    |                                                        |                                                        |                                                                              |                                                                              |                                               |
|            | Lack of security infrastructure for cooperative vehicle data             |                                             |                                       |                                          |                                                                                          |                                                                                   |                                                    |                                                        |                                                        |                                                                              |                                                                              |                                               |</p>
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2. Please identify more enablers and barriers if any:


3. Could you please rate the relevance of each stakeholder to each barrier/enabler below
   [Please put -2 = Lowest relevance, +2 = Highest relevance in each relevant cell]?

<table>
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<tr>
<th>Type</th>
<th>Enablers</th>
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<td>Legal</td>
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<td>Government</td>
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<tr>
<td>Type</td>
<td>Barriers</td>
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<tr>
<td>User-Market</td>
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<td>Limited understanding of user needs</td>
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<tr>
<td>Conceptual</td>
<td>Ambiguous reliability of data exchanged</td>
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<td></td>
<td>Limited political acceptance and intervention</td>
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<td>Unaddressed security and data management</td>
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<td>Need for a (a currently missing) mechanism for open location data</td>
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<td>Lack of stakeholder cooperation</td>
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<td>Users’ privacy concern</td>
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### Barriers

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<tr>
<th>Type</th>
<th>Barriers</th>
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<td>Technology Provider</td>
<td>Unsupported regulation and legal framework</td>
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</tbody>
</table>

### Business Models

4. **Could you please prioritise the following promotion strategies, according to their importance in stimulating MaaS’ business success** [1 = the most important, 8 = the least important]?

<table>
<thead>
<tr>
<th>Promotion strategy</th>
<th>Ranking order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loyalty schemes</td>
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<tr>
<td>Promotion campaigns</td>
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<td>Scaling discounts</td>
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<td>Added value services</td>
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<td>Tax reductions</td>
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<td>Calculating CO(_2) reductions by eco driving</td>
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<td>Comparing environmental benefits because of modal shifts</td>
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<tr>
<td>Crowdsourcing rewards</td>
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<td><strong>Other (please define)</strong></td>
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</tbody>
</table>

5. **Could you please prioritise the following socially responsible traveller strategies, according to their importance in influencing travellers’ behaviour towards environmentally friendly mobility choices** [1 = the most important, 7 = the least important]?

<table>
<thead>
<tr>
<th>Socially responsible traveller strategy</th>
<th>Ranking order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loyalty schemes</td>
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## Socially responsible traveller strategy

<table>
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<tr>
<td>Other (please define)</td>
<td></td>
</tr>
</tbody>
</table>

## MyCorridor Use Cases

6. Could you please rate each planned function/Use Case of MyCorridor one-stop-shop as **Essential** or **Secondary** [please put X in the corresponding cell per each]?

<table>
<thead>
<tr>
<th>Planned function/Use Case</th>
<th>Essential</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>From the traveller’s interaction point of view</td>
<td></td>
<td></td>
</tr>
<tr>
<td>User Login/Register/Authentication</td>
<td></td>
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</tr>
<tr>
<td>Profile set-up/edit</td>
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<tr>
<td>Personalised MaaS product selection and booking (trip planning included as an option)</td>
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<tr>
<td>Personalised Info support (added value services – athletic, touristic, cultural, health push personalised information) - Push notifications</td>
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<tr>
<td>MaaS product payment and voucher(s) issue</td>
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<tr>
<td>Redemption (use/validation) – Token consumption at Mobility service providers</td>
<td></td>
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<tr>
<td>Change/Cancelation</td>
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<tr>
<td>Traveller feedback (Quality of overall Service provided monitoring)</td>
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<tr>
<td>Loyalty scheme/Rewarding</td>
<td></td>
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<tr>
<td>From the MaaS Issuer/Aggregator/Operator’s interaction point of view</td>
<td></td>
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</tr>
<tr>
<td>Matchmaking for MaaS product delivery (for travellers)</td>
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<tr>
<td>Overall Business Rules editing</td>
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<td></td>
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<tr>
<td>Provided services performance ranking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synthesis of added value services</td>
<td></td>
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</tr>
<tr>
<td>Multicriteria search functionality</td>
<td></td>
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</tr>
<tr>
<td>Back office synergies with participating service providers – Euro-Mobility ticket</td>
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<tr>
<td>From the Payment Facility’s interaction point of view</td>
<td></td>
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<tr>
<td>E-money voucher to the traveller</td>
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<tr>
<td>Clearance - vouchers issue and distribution (to participating service providers)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clearance – vouchers redemption</td>
<td></td>
<td></td>
</tr>
<tr>
<td>From the participating Service Providers’ interaction point of view</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service provider log in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service registration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service provider business rules editing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. If there are any further functions you believe that should be supported through the one-stop-shop (from whichever actor point of view), please describe and justify in short below:
8. Please select which are, in your opinion, the most crucial aspects that should be addressed in the traveller’s interaction with the one-stop-shop [more than one options are applicable]?

- User Interface friendliness and intuitiveness
- Minimum time spent on the app for a full service cycle (from searching to payment)
- Security of transactions and data protection
- Overall service reliability (the app opens and works)
- Provided info reliability
- Ability to store favorite POI’s and frequent routes in profile
- Significant number of options available (for the same Origin-Destination requests)
- Finances tracking – “MyWallet” (track my spending, savings, etc.)
- Feedback from other users about the options available
- Transaction history storage
- Personalisation success (“are the traveller needs and preferences met in the mobility product delivered?”)

Open thoughts

9. You are welcome to share thoughts and concerns on MaaS and MyCorridor as you wish:

We would be happy to receive your feedback about our workshop and our project.

10. Did the workshop meet your expectations?

- 2 -1 0 1 2

11. Would you like to be invited to the next workshop that will be organised by the MyCorridor project?

- Yes  ☒ No ☐

12. Do you think MyCorridor project is on the right path towards achieving its goals?

- 2 -1 0 1 2

13. Do you think MyCorridor project is in the right direction contributing to MaaS vision?

- 2 -1 0 1 2

14. Do you think MyCorridor project will bring an added value to the MaaS concept and implementation?

- 2 -1 0 1 2

You are welcome to join us!

- If you want to join the MyCorridor Interest Group and be informed on the progress of the project, please sign-up at: http://mycorridor.eu/interest-group/
- If you are a service provider (infomobility, mobility or other type) and you would like to be part of MyCorridor one-stop-shop that will be developed and of the targeted focus groups that will be planned in near future, please contact respectively Dr. Maria Gkemou at: mgemou@certh.gr
Thank you for your participation and feedback in our workshop and this survey!

*The MyCorridor Consortium*

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 636626.
Annex 5: Use Cases UML

Traveller Use Cases
Service Providers Use Cases
B1 Use Case

MyCorridor System

- Log in overall Business Rules editor page
  - 0..*

- Edit business rules
  - 0..*

- Define conditional parameters
  - 0..*

- Confirm business rules editing
  - 0..*
B2 Use Case
B3 and B4 Use Cases
B5 Use Case
## Annex 6: Inventory of services

### MyCorridor Services Clustering

<table>
<thead>
<tr>
<th>ID</th>
<th>Service Cluster Sub-cluster</th>
<th>Mobility Products</th>
<th>My Corridor One-Stop-Shop relevant services</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mobility Vehicle related / Parking</td>
<td>Parking</td>
<td>Purchase e-tickets</td>
</tr>
<tr>
<td>2.</td>
<td>Mobility Vehicle related / Parking</td>
<td>Parking</td>
<td>Booking parking space</td>
</tr>
<tr>
<td>3.</td>
<td>Mobility Vehicle related / Parking</td>
<td>Parking</td>
<td>Parking availability information</td>
</tr>
<tr>
<td>4.</td>
<td>Mobility Vehicle related / Parking</td>
<td>Parking</td>
<td>Route planning</td>
</tr>
<tr>
<td>5.</td>
<td>Mobility Vehicle related / PT</td>
<td>Park&amp;Ride</td>
<td>Purchase e-tickets</td>
</tr>
<tr>
<td>6.</td>
<td>Mobility Vehicle related / PT</td>
<td>Park&amp;Ride</td>
<td>Booking parking space</td>
</tr>
<tr>
<td>7.</td>
<td>Mobility Vehicle related / PT</td>
<td>Park&amp;Ride</td>
<td>Parking availability information</td>
</tr>
<tr>
<td>8.</td>
<td>Mobility Vehicle related / PT</td>
<td>Park&amp;Ride</td>
<td>PT scheduled information</td>
</tr>
<tr>
<td>9.</td>
<td>Mobility Vehicle related / PT</td>
<td>Park&amp;Ride</td>
<td>PT real time information</td>
</tr>
<tr>
<td>10.</td>
<td>Mobility Vehicle related/ rental</td>
<td>Car rental</td>
<td>Renting car (pre-purchasing)</td>
</tr>
<tr>
<td>11.</td>
<td>Mobility Vehicle related/ sharing - pooling</td>
<td>Car-pooling</td>
<td>Car-pooling search, booking and purchase</td>
</tr>
<tr>
<td>12.</td>
<td>Mobility Vehicle related/ sharing - pooling</td>
<td>Car/ride sharing</td>
<td>Booking shared car</td>
</tr>
<tr>
<td>13.</td>
<td>Mobility Vehicle related/ sharing - pooling</td>
<td>Car/ride sharing</td>
<td>Purchase shared car e-tickets</td>
</tr>
<tr>
<td>14.</td>
<td>Mobility Vehicle related/ sharing - pooling</td>
<td>Car/ride sharing</td>
<td>Ride sharing apply and book</td>
</tr>
<tr>
<td>ID</td>
<td>Service Cluster Sub-cluster</td>
<td>Mobility Products</td>
<td>My Corridor One-Stop-Shop relevant services</td>
</tr>
<tr>
<td>-----</td>
<td>-----------------------------</td>
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<td>-------------------------------------------</td>
</tr>
<tr>
<td>15.</td>
<td>Mobility Vehicle related/ sharing – pooling</td>
<td>(e)Bike Sharing</td>
<td>Booking shared bike</td>
</tr>
<tr>
<td>16.</td>
<td>Mobility Vehicle related/ sharing – pooling</td>
<td>Purchase shared (e)bicycle e-tickets</td>
<td>Purchase shared bicycle e-tickets</td>
</tr>
<tr>
<td>17.</td>
<td>Mobility Public Transport (Para transit)</td>
<td>Taxi</td>
<td>Taxi apply and book</td>
</tr>
<tr>
<td>18.</td>
<td>Mobility Tourist</td>
<td>Bus services</td>
<td>Available information</td>
</tr>
<tr>
<td>19.</td>
<td>Mobility Public transport</td>
<td>Urban PT</td>
<td>Purchase e-tickets</td>
</tr>
<tr>
<td>20.</td>
<td>Mobility Public transport</td>
<td>Urban PT</td>
<td>PT scheduled information</td>
</tr>
<tr>
<td>21.</td>
<td>Mobility Public transport</td>
<td>Urban PT</td>
<td>PT real time information</td>
</tr>
<tr>
<td>22.</td>
<td>Mobility Public transport</td>
<td>Interurban PT (train, maritime, bus)</td>
<td>PT scheduled information</td>
</tr>
<tr>
<td>23.</td>
<td>Mobility Public transport</td>
<td>Interurban PT (train, maritime, bus)</td>
<td>PT real time information</td>
</tr>
<tr>
<td>24.</td>
<td>Mobility Public transport</td>
<td>Interurban PT (train, maritime, bus)</td>
<td>Purchase e-tickets</td>
</tr>
<tr>
<td>25.</td>
<td>Mobility Vehicle related/Public Transport</td>
<td>Ferry boat booking/ticketing</td>
<td>Route planning</td>
</tr>
<tr>
<td>26.</td>
<td>Mobility Vehicle related/Public Transport</td>
<td>Ferry boat booking/ticketing</td>
<td>Booking</td>
</tr>
<tr>
<td>27.</td>
<td>Mobility Vehicle related/Public Transport</td>
<td>Ferry boat booking/ticketing</td>
<td>Purchase tickets</td>
</tr>
<tr>
<td>28.</td>
<td>Mobility Vehicle related/Public Transport</td>
<td>Ferry boat booking/ticketing</td>
<td>PT scheduled information</td>
</tr>
<tr>
<td>29.</td>
<td>Traffic Management Advanced traffic management services</td>
<td>Adaptive real-time traffic management</td>
<td>Real time traffic state and forecast</td>
</tr>
<tr>
<td>30.</td>
<td>Traffic Management Advanced traffic management services</td>
<td>Adaptive real-time traffic management</td>
<td>Event Management</td>
</tr>
<tr>
<td>ID</td>
<td>Service Cluster \nSub-cluster</td>
<td>Mobility Products</td>
<td>My Corridor One-Stop-Shop relevant services</td>
</tr>
<tr>
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</tr>
<tr>
<td>31.</td>
<td>Traffic Management \nAdvanced traffic management services</td>
<td>Adaptive real-time traffic management</td>
<td>Advanced Traffic Forecasting</td>
</tr>
<tr>
<td>32.</td>
<td>Traffic Management \nAccess control &amp; Tolling</td>
<td>Zone access control</td>
<td>Zone access control information</td>
</tr>
<tr>
<td>33.</td>
<td>Traffic Management \nC-ITS</td>
<td>Cooperative Traffic Management</td>
<td>GLOSA, Traffic light status, traffic light forecast</td>
</tr>
<tr>
<td>34.</td>
<td>Traffic Management \nC-ITS</td>
<td>Cooperative Traffic Management</td>
<td>Traffic events</td>
</tr>
<tr>
<td>35.</td>
<td>Infomobility \nMultimodal</td>
<td>N/A</td>
<td>Multi modal journey planner</td>
</tr>
<tr>
<td>36.</td>
<td>Infomobility \nPublic Transport</td>
<td>N/A</td>
<td>Multi-modal service real time information (urban PT, ferry boat, train, interurban bus)</td>
</tr>
<tr>
<td>37.</td>
<td>Infomobility \nPark &amp; Ride</td>
<td>N/A</td>
<td>Real time information for parking availability and PT estimated time of arrival</td>
</tr>
<tr>
<td>38.</td>
<td>Infomobility \nPark &amp; Ride</td>
<td>N/A</td>
<td>Parking info</td>
</tr>
<tr>
<td>39.</td>
<td>Added Value \nTouristic/Entertainment</td>
<td>N/A</td>
<td>Push services for cultural, health, sports, touristic information/recommendation</td>
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<tr>
<td>40.</td>
<td>Added Value \nHorizontal</td>
<td>N/A</td>
<td>Eco driving</td>
</tr>
<tr>
<td>41.</td>
<td>Added Value \nSynthetic</td>
<td>N/A</td>
<td>Synthesis of new mobility products</td>
</tr>
<tr>
<td>ID</td>
<td>Service Cluster Sub-cluster</td>
<td>Mobility Products</td>
<td>My Corridor One-Stop-Shop relevant services &amp; Description</td>
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</tr>
<tr>
<td>1</td>
<td>Mobility Vehicle related / Parking</td>
<td>Parking</td>
<td>Purchase e-tickets</td>
</tr>
<tr>
<td>2</td>
<td>Mobility Vehicle related / Parking</td>
<td>Parking</td>
<td>Parking availability information</td>
</tr>
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<td>3</td>
<td>Mobility Vehicle related / Parking</td>
<td>Parking</td>
<td>Parking availability information</td>
</tr>
<tr>
<td>4</td>
<td>Mobility Vehicle related / Parking</td>
<td>Parking</td>
<td>Parking availability information</td>
</tr>
</tbody>
</table>

3 Public, private with free access only for MyCorridor, private with access upon MoU, etc.
<table>
<thead>
<tr>
<th>ID</th>
<th>Service Cluster Sub-cluster</th>
<th>Mobility Products</th>
<th>My Corridor One-Stop-Shop relevant services</th>
<th>MyCorridor Beneficiaries services &amp; Description</th>
<th>TM 2.0 enabled</th>
<th>Availability in MyCorridor Sites</th>
<th>Service Provider /Integrator &amp; Service Content Owner</th>
<th>Terms of Use</th>
<th>Current TR L</th>
<th>Available API (Yes/No)</th>
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<tbody>
<tr>
<td></td>
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<td>beneficary) &amp; Owner: ATAC</td>
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<tr>
<td>5.</td>
<td>Mobility Vehicle related / Parking</td>
<td>Parkin g</td>
<td>Route planning</td>
<td>concernin g: location, time period, fare, and parking availability (dependin g on ATAC if the company has developed the central control system)</td>
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<td>Service Provider: SRFG (MyCorridor beneficary)</td>
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<td></td>
<td>Service Content owner: Salzburg Transport Association</td>
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</tr>
<tr>
<td>7.</td>
<td>Mobility Vehicle related / PT</td>
<td>Park &amp; Ride</td>
<td>Booking parking space in Municipal</td>
<td>Booking parking space in Municipal</td>
<td>X</td>
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<td>Service Provider /Integrator: AMCO</td>
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<td>Private with access upon MoU with City of Salz burg</td>
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<tr>
<td>ID</td>
<td>Service Cluster Sub-cluster</td>
<td>Mobility Products</td>
<td>MyCorridor One-Stop-Shop relevant services</td>
<td>MyCorrid or Beneficiaries services &amp; Description</td>
<td>TM 2.0 enabled</td>
<td>Availability in MyCorridor Sites</td>
<td>Service Provider / Integrator &amp; Service Content Owner</td>
<td>Terms of Use</td>
<td>Current TR L</td>
<td>Available API (Yes/No)</td>
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<td>Service Content Owner: Municipal ity of Loutraki</td>
<td>access only for MyCorridor upon MoU with the Munici pality of Loutraki</td>
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</tr>
<tr>
<td>8.</td>
<td>Mobility Vehicle related / PT</td>
<td>Park&amp; Ride</td>
<td>Parking availability information</td>
<td>Park and ride in Salzburg: public infomobili ty services for passenger cars in the city of Salzburg</td>
<td>X</td>
<td></td>
<td>Service Provider: SRFG</td>
<td>Priv ate with access upon MoU with City of Salz burg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Mobility Vehicle related / PT</td>
<td>Park&amp; Ride</td>
<td>PT scheduled information</td>
<td></td>
<td></td>
<td></td>
<td>Service Content Owner: City of Salzburg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Mobility Vehicle related</td>
<td>Park&amp; Ride</td>
<td>PT real time</td>
<td></td>
<td></td>
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</tbody>
</table>

4 https://www.data.gv.at/katalog/dataset/9087fe9a-1dd4-49a1-98b4-8a8c659eb64f
<table>
<thead>
<tr>
<th>ID</th>
<th>Service Cluster Sub-cluster</th>
<th>Mobility Products</th>
<th>MyCorridor One-Stop-Shop relevant services &amp; Description</th>
<th>MyCorridor Beneficiaries</th>
<th>TM 2.0 enabled</th>
<th>Availability in MyCorridor Sites</th>
<th>Service Provider/Integrator &amp; Service Content Owner</th>
<th>Terms of Use</th>
<th>Current TRL</th>
<th>Available API (Yes/No)</th>
</tr>
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<td>G</td>
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</tr>
<tr>
<td>11.</td>
<td>Mobility Vehicle related/ rental</td>
<td>Car rental</td>
<td>Renting car (pre-purchasing)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Mobility Vehicle related/ sharing - pooling</td>
<td>Car/ride sharing</td>
<td>Car-pooling search, booking and purchase</td>
<td>BlaBlaCar car pooling service (booking/ticketing API is not available; only search for now)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Mobility Vehicle related/ sharing - pooling</td>
<td>Car/ride sharing</td>
<td>Booking shared car</td>
<td>Booking shared car in Rome: Booking for cars/vans sharing services.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Mobility Vehicle related/ sharing - pooling</td>
<td>Car/ride sharing</td>
<td>Purchase shared car e-tickets</td>
<td>Purchase shared car e-tickets in Rome: Purchase e-tickets for cars/vans sharing services.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ID</td>
<td>Service Cluster Sub-cluster</td>
<td>Mobility Products</td>
<td>My Corridor One-Stop-Shop relevant services &amp; Description</td>
<td>MyCorridor Beneficiaries</td>
<td>Availability in MyCorridor Sites</td>
<td>Service Provider/Integrator &amp; Service Content Owner</td>
<td>Terms of Use</td>
<td>Current TRL</td>
<td>Available API (Yes/No)</td>
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<td></td>
</tr>
<tr>
<td>15</td>
<td>Mobility Vehicle related/sharing - pooling</td>
<td>Car/ride sharing</td>
<td>Ride sharing apply and book</td>
<td>Bike sharing in MyCorridor</td>
<td>X</td>
<td>Service Provider/Integrator: AMCO</td>
<td>Private with free access only for MyCorridor upon MoU with the Municipality of Loutraki</td>
<td>Privat</td>
<td>9</td>
<td>No</td>
</tr>
<tr>
<td>16</td>
<td>Mobility Vehicle related/sharing - pooling</td>
<td>(e)Bike Sharing</td>
<td>Booking shared bike</td>
<td>Bike sharing in Loutraki: Travellers will be able to check the availability of bikes for each bike sharing station and purchase a username/password that will be used to get a bike from a station</td>
<td></td>
<td>Service Content owner: Municipalité of Loutraki</td>
<td>Privat</td>
<td>Not known yet</td>
<td>Not known yet</td>
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<tr>
<td>17</td>
<td>Mobility Vehicle related/sharing - pooling</td>
<td>(e)Bike Sharing</td>
<td>Booking shared bike</td>
<td>sBike – Bike sharing in Salzburg (to come): Booking e-tickets for the city of Salzburg.</td>
<td>X5</td>
<td>Service Provider: SRFG</td>
<td>Private with access upon MoU with SRF</td>
<td>Privat</td>
<td>Not known yet</td>
<td>Not known yet</td>
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5 Only for the City of Salzburg
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<th>Availability in MyCorridor Sites</th>
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<th>Terms of Use</th>
<th>Current TRL</th>
<th>Available API (Yes/No)</th>
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<tr>
<td>18</td>
<td>Mobility Vehicle related/sharing - pooling</td>
<td>(e)Bike Sharing</td>
<td>Bookings</td>
<td>Livecrowd (OV-Fiets): RealTime Availability of ‘rent’bikes named OV-Fiets</td>
<td>X</td>
<td></td>
<td>Service Provider &amp; Content Owner: Brand MKRS BMCA</td>
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<tr>
<td>19</td>
<td>Mobility Vehicle related/sharing - pooling</td>
<td>Purchase shared (e)cycle e-tickets</td>
<td>Purchase shared bicycle e-tickets</td>
<td>sBike – Bike sharing in Salzburg (to come): Purchasing e-tickets for the city of Salzburg</td>
<td>X</td>
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<td>Service Provider: SRFG</td>
<td>Priv with access upon MoU with SRFG</td>
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<tr>
<td>20</td>
<td>Mobility Public Transport (Paratransit)</td>
<td>Taxi apply and book</td>
<td>Taxi service in Salzburg (Taxi.eu): Availability, booking and purchasing in the city of Salzburg</td>
<td></td>
<td></td>
<td>Service Provider: SRFG</td>
<td>Priv with access upon MoU with taxi.eu</td>
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<tr>
<td>21</td>
<td>Mobility Public Transpo</td>
<td>Taxi apply and book</td>
<td>Splty taxi services: Splty integ</td>
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<td>Service Provider: Splty</td>
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6 Only for the City of Salzburg
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<th>Available API (Yes/No)</th>
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<tr>
<td></td>
<td>rt (Para transit)</td>
<td>book</td>
<td>rates a variety of taxi booking platforms, an is the first ever global taxi alliance and is expanding its service to integrate with other modes of transport, such as airlines.</td>
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<td>Technolo gies Ltd.</td>
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<tr>
<td>22.</td>
<td>Mobility Public Transport (Para transit)</td>
<td>Taxi</td>
<td>Taxi apply and book in Rome: App available (Chiamata xi) for real time taxi services booking (about 500 taxies). Taxi are equipped with tablet or smartphone (GPS) to manage call to the</td>
<td></td>
<td>X</td>
<td></td>
<td>Service Provider &amp; Owner: RSM</td>
<td>Private with access only for MyCorridor</td>
<td>8</td>
<td>Not known yet</td>
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<td>ID</td>
<td>Service Cluster Sub-cluster</td>
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<td>Availability in MyCorridor Sites</td>
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<td>Terms of Use</td>
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<tr>
<td>23.</td>
<td>Mobility Tourist</td>
<td>Bus services</td>
<td>Available information</td>
<td>Information about tourist bus services in Rome: Information available about tourist bus viability rules, parking, permissions, access control zone, fare, permission booking and buying.</td>
<td>X</td>
<td></td>
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<td>24.</td>
<td>Mobility Tourist</td>
<td>Bus services</td>
<td>Available information</td>
<td>CheckMy Bus search engine for international bus trips: Enabling the user to find the best offers, cheapest tickets and most</td>
<td>X X X X</td>
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nearest taxi. Payment directly to taxi driver.
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Convenient journeys. CheckMyBus shows you all available bus operators at a glance, providing information about each bus company, the user can search for a variety of parameters, for example, if WiFi is available or if complimentary snacks and drinks are offered. The service is available through a web browser and as an iPhone app.
<table>
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<tr>
<th>ID</th>
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<th>Mobility Products</th>
<th>My Corridor One-Stop-Shop relevant services</th>
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<tr>
<td>25.</td>
<td>Mobility Public transport</td>
<td>Urban PT</td>
<td>Purchase e-tickets</td>
<td>Livecrowd: Possibility to buy tickets for PT.</td>
<td>X</td>
<td></td>
<td></td>
<td>Service Provider &amp; Content Owner: Brand MKRS (third party MapTM)</td>
<td>Privately with access upon MoU with operator</td>
<td>7</td>
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<td></td>
<td>Service Provider: SRFG (MyCorridor beneficiary)</td>
<td>Privately with access upon MoU</td>
<td>7</td>
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<tr>
<td>27.</td>
<td>Mobility Public transport</td>
<td>Urban PT</td>
<td>Purchase of PT e-tickets in Rome: Purchase of PT e-tickets (metro, buses, trams) through app</td>
<td>Purchase of PT e-tickets in Rome: Purchase of PT e-tickets (metro, buses, trams) through app</td>
<td>X 7</td>
<td></td>
<td></td>
<td>Service Provider: Pluservice</td>
<td>Upon MoU with ATAC and Pluservice</td>
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7 Only Rome.
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<th>Available API (Ye s/N o)</th>
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<tr>
<td></td>
<td>28. Mobility Public transport</td>
<td>Urban PT</td>
<td>PT scheduled information</td>
<td>Livecrowd (92920V) : Scheduled PT arrival, departure and location timing. All of Netherlands and some cross-border services.</td>
<td>X</td>
<td></td>
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<tr>
<td></td>
<td>29. Mobility Public transport</td>
<td>Urban PT</td>
<td>PT scheduled information in Rome: Urban PT information (timetables) in Rome (metro, buses, trams)</td>
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<tr>
<td>30.</td>
<td>Mobility Public transport</td>
<td>Urban PT</td>
<td>PT real time information</td>
<td>PT real time information in Rome: PT real time information concerning urban PT in Rome (buses, trams).</td>
<td>X 8</td>
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<tr>
<td>31.</td>
<td>Mobility Public transport</td>
<td>Interurban PT (train, maritime, bus)</td>
<td>PT scheduled information</td>
<td>AMSBus by ČSAD SVT Praha s.r.o.: Advanced Coach Ticketing system giving timetables. It covers all CZ regions as well as particular routes from CZ to</td>
<td>X</td>
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*Only Rome.*
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<td>DE/AT/NL/IT</td>
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<td>32.</td>
<td>Mobility Public transport</td>
<td>Interurban PT (train, maritime, bus)</td>
<td>PT real time information</td>
<td>AMSBus by ČSAD SVT Praha s.r.o.: Advanced Coach Ticketing system allowing purchase. It covers all CZ regions as well as particular routes from CZ to DE/AT/NL/IT</td>
<td></td>
<td>X</td>
<td>Service Provider: Chaps Service Content owner: ČSAD SVT Praha s.r.o.</td>
<td>Priv at e with free acces s only for MyC or ri dor</td>
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<td>33.</td>
<td>Mobility Public transport</td>
<td>Interurban PT (train, maritime, bus)</td>
<td>Purchase e-tickets</td>
<td>Fare collection system for Korinthos interurban buses: Travellers will be able to purchase a</td>
<td></td>
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<td>Service Provider/Integrator: AMCO Service Content Owner: Korinthia Interurban Bus</td>
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<td>Mobility Public transport</td>
<td>Interurban PT (train, maritime, bus)</td>
<td>Purchase e-tickets</td>
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<td>QR code ticket for a specific route and validate it when entering the bus.</td>
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<td>Company upon MoU with Korthi a Interurban Bus Company</td>
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<td>35.</td>
<td>Mobility Vehicle related/ Public Transport</td>
<td>Ferry booking/ticketing</td>
<td>Route planning</td>
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<td>36.</td>
<td>Mobility Vehicle related/ Public Transport</td>
<td>Ferry booking/ticketing</td>
<td>Booking</td>
<td>VivaWallet ferry boat ticketing service</td>
<td>X</td>
<td>Service Provider/Owner: VivaWallet</td>
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<td>37.</td>
<td>Mobility Vehicle related/ Public Transport</td>
<td>Ferry booking/ticketing</td>
<td>Purchase tickets</td>
<td>VivaWallet ferry boat ticketing service</td>
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<td>Service Provider/Owner: VivaWallet</td>
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<td>38.</td>
<td>Mobility Vehicle related/Public Transport</td>
<td>Ferry boat booking/ticketing</td>
<td>PT scheduled information</td>
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<td>39.</td>
<td>Traffic Management Advanced traffic management services</td>
<td>Adaptive real-time traffic management</td>
<td>Real Time Traffic Flow (by TomTom): It delivers a real time, detailed view of traffic speeds on the entire road network, designed for easy integration into traffic management systems or routing engines to calculate current travel times. It is based on GPS probes.</td>
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TomTom

Private with free access only for MyCorridor

TomTom.com/online-traffic/
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<td>40.</td>
<td>Traffic Management</td>
<td>Adaptive real-time traffic management</td>
<td>Real time traffic state and forecast</td>
<td>Adaptive traffic management by Gevas software (SRFG): Adaptive traffic control in the city of Salzburg</td>
<td>X</td>
<td>X</td>
<td>Service Provider: SRFG Service Content Owner: City of Salzburg</td>
<td>Closer syst em, no access via API; access upon MoU with City of Salzburg</td>
<td>9</td>
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<tr>
<td>41.</td>
<td>Traffic Management</td>
<td>Adaptive real-time traffic management</td>
<td>Real time traffic state and forecast</td>
<td>Real Time Traffic State: Traffic Data collection by different integrated sources (road sensors and FCD by navigation system by TomTom with Traffic Informatio n related to traffic</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Service Provider &amp; Content Owner: SWARCO MIZAR/SWARCO HELLAS</td>
<td>Private with free access only for MyCorridor</td>
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<td>42.</td>
<td>Traffic Management</td>
<td>Adaptive</td>
<td>Real time traffic state and forecast</td>
<td>Open real time traffic &amp; forecast service</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td></td>
<td>Advanced traffic management services</td>
<td>real-time traffic management</td>
<td>through LiveCrowd based on data from road side measurement hardware (realTime) and data</td>
<td>through LiveCrowd based on data from road side measurement hardware (realTime) and data</td>
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flow and traffic incident, data process, integration, validation and elaboration to provide comprehensive information about the road network status. Traffic data will be provided to MyCorridor platform.
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<th>Service Cluster Sub-cluster</th>
<th>Mobility Products</th>
<th>MyCorridor One-Stop-Shop relevant services</th>
<th>MyCorridor Beneficiaries services &amp; Description</th>
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<td>N L A T G R I T E C Z</td>
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<tr>
<td>43.</td>
<td>Traffic Management</td>
<td>Adaptive real-time traffic management</td>
<td>Event Management</td>
<td>Real-time Road Traffic Information in Austria (by EVIS.AT): Traffic flow, traffic incident (available in 2019)</td>
<td>X X</td>
<td></td>
<td>Service provider: SRFG</td>
<td>Service Content owner: EVIS</td>
<td>Priv with access upon MoU between EVIS &amp; SRFG</td>
<td>6</td>
</tr>
<tr>
<td>44.</td>
<td>Traffic Management</td>
<td>Adaptive real-time traffic management</td>
<td>Event Management</td>
<td>Real Time Traffic incidents (by TomTom): It provides information on the location, cause and impact of traffic jams and other incidents such as road closures, road works, lane</td>
<td>X X X X</td>
<td></td>
<td>Service Provider &amp; Content owner: TomTom</td>
<td></td>
<td>Priv with free access only for MyCorridor</td>
<td>7</td>
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<tr>
<td>45</td>
<td>Traffic Management</td>
<td>Adaptive real-time traffic management</td>
<td>SWARCO event Management in Rome and Athens: Traffic Data collected from Traffic Control Centre by different integrated data sources are processed, integrated, validated and elaborated. Real Time event, Travel time, traffic strategies are published by VMS (integrated or virtual) and made available</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Service Provider &amp; Content Owner: SWARCO MIZAR/SWARCO HELLAS</td>
<td>Private with free access only for MyCorridor</td>
<td>8</td>
<td>Yes</td>
</tr>
</tbody>
</table>

- **Traffic Management**
  - **Adaptive real-time traffic management services**
  - **Event Management**
  - **SWARCO event Management in Rome and Athens:**
    - Traffic Data collected from Traffic Control Centre by different integrated data sources are processed, integrated, validated and elaborated.
    - Real Time event, Travel time, traffic strategies are published by VMS (integrated or virtual) and made available.

- **Availability in MyCorridor Sites**
  - N: Netherlands
  - A: Austria
  - T: Spain
  - G: Italy
  - R: Switzerland
  - I: Denmark
  - T: Estonia
  - D: Czech Republic

- **Service Provider/Integrator & Service Content Owner:**
  - SWARCO MIZAR/SWARCO HELLAS

- **Terms of Use:**
  - Private with free access only for MyCorridor

- **Current TRL:**
  - 8

- **Available API (Yes/No):**
  - Yes
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<tr>
<th>ID</th>
<th>Service Cluster Sub-cluster</th>
<th>Mobility Products</th>
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<th>Availability in MyCorridor Sites</th>
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<th>Available API (Yes/No)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>to MyCorridor platform. Scheduled events will be provided to TomTom.</td>
<td></td>
<td></td>
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<tr>
<td>46.</td>
<td>Traffic Management</td>
<td>Adaptive real-time traffic management</td>
<td>Advanced Traffic Forecasting</td>
<td>FCD-based Real-time Traffic State and Forecast in Salzburg: Traffic flow, traffic incident</td>
<td>X</td>
<td>X 9</td>
<td>Service Provider &amp; Content owner: SRFG</td>
<td>Privately with free access only for MyCorridor</td>
<td>8</td>
<td>Yes (DA TEX II Austria Profile)</td>
</tr>
<tr>
<td>47.</td>
<td>Traffic Management</td>
<td>Adaptive real-time traffic management</td>
<td>Advanced Traffic Forecasting</td>
<td>SWARCO Advanced Traffic Forecasting in Rome (PRATI area) and Athens: Traffic Data collection by different integrated sources (road sensors,</td>
<td>X</td>
<td>X</td>
<td>Service Provider &amp; Content Owner: SWARCO MIZAR/S WARCO HELLAS</td>
<td>Privately with free access only for MyCorridor</td>
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<td>Yes</td>
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5 Only in Salzburg.
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<th>Current TR L</th>
<th>Available API (Yes/No)</th>
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<tbody>
<tr>
<td>48.</td>
<td>Traffic Management Access control &amp; Zone access control</td>
<td>Zone access control</td>
<td>Zone Access Control Information in Rome:</td>
<td>X</td>
<td></td>
<td></td>
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</table>

Traffic Control and FCD by TomTom navigation system with Traffic Information related to traffic flow and traffic incident), data process, integration, validation and elaboration to enable traffic state forecast (Travel Time). These data will be provided to MyCorridor platform.
<table>
<thead>
<tr>
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<th>Current TR L</th>
<th>Available API (Yes/No)</th>
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<tr>
<td></td>
<td><strong>Tolling</strong></td>
<td></td>
<td>Zone Access Control Information (Open/Closed/Area/access authorisation) provision to the MyCorridor platform.</td>
<td></td>
<td></td>
<td></td>
<td>MIZAR Service Content Owner: RSM</td>
<td>accecss only for MyCorridor</td>
<td></td>
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</tr>
<tr>
<td>49</td>
<td>Traffic Management C-ITS</td>
<td>Coöperative Traffic Management</td>
<td>GLOSA, Traffic light status, traffic light forecast</td>
<td>GLOSA in ROME (PRATI area) and Thessaloniki: Traffic Light status and Forecast (TLF) elaborated by the Traffic Control Centre (Forecast Service) for the monitored intersections. Visualisation of the TLF via app.</td>
<td>X</td>
<td></td>
<td>Service Provider &amp; Owner: SWARCO Mizar/SWARCO Hellas</td>
<td>Privately with free access only for MyCorridor</td>
<td>6</td>
<td>Yes</td>
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<tr>
<td>ID</td>
<td>Service Cluster Sub-cluster</td>
<td>Mobility Products</td>
<td>My Corridor One-Stop-Shop relevant services</td>
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<tr>
<td>50.</td>
<td>Traffic Management C-ITS</td>
<td>Cooperative Traffic Management</td>
<td>Traffic events</td>
<td></td>
<td></td>
<td>N/A</td>
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</tr>
<tr>
<td>51.</td>
<td>Infomobility Multimodal</td>
<td>N/A</td>
<td>Multimodal journey planner</td>
<td>VBB-Fahrinfo, VBN FarrPlaner &amp; HAFAS multimodal journey planner by HaCon: Covering: PT (ferry, bus, tram, subway, commuter trains, trains, fast trains, walk, bike, car, taxi, P+R)</td>
<td>X</td>
<td>Service Provider: HaCon</td>
<td>Service Content Owner: Operators giving permission to HaCon</td>
<td>Priv ate with free access only for MyCorridor</td>
<td>9 (Productive system)</td>
<td>Yes</td>
</tr>
<tr>
<td>52.</td>
<td>Infomobility Multimodal</td>
<td>N/A</td>
<td>Multimodal journey planner</td>
<td>Route planning/On-line routing by TomTom: Calculate Route - calculates a route between an origin and a destination, passing</td>
<td>X</td>
<td>Service Provider &amp; Content Owner: TomTom (MyCorridor beneficiary)</td>
<td>Private with free access only for MyCorridor</td>
<td>6</td>
<td>Yes</td>
<td><a href="http://developer.tomtom.com/online-routing">http://developer.tomtom.com/online-routing</a></td>
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<tr>
<td>ID</td>
<td>Service Cluster Sub-cluster</td>
<td>Mobility Products</td>
<td>MyCorridor One-Stop-Shop relevant services</td>
<td>MyCorridor Beneficiaries services &amp; Description</td>
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through waypoints (if specified). Additional routing parameter(s) like traffic, avoidance conditions, departure/arrival time etc. can be taken into account. *Calculate Reachable Range* - calculates a set of locations that can be reached from the origin point, subject to the available fuel or energy budget that is specified in the request. *Batch* - allows
<table>
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<tbody>
<tr>
<td>53</td>
<td>Infomobility Multimodal</td>
<td>N/A</td>
<td>Multimodal journey planner</td>
<td>IDOS journey planner: Leading Czech journey</td>
<td>X</td>
<td>Service Provider &amp; Content Owner: Chaps</td>
<td>Private with free access</td>
<td>9</td>
<td>Yes</td>
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<tr>
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<td>Current TRL</td>
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<td>planner. System database currently includes: Public bus timetables (complete domestic traffic and majority of through traffic), approximately 85000 trips, 302 operators. Rail transport timetables, approximately 10000 trips, 6 operators. Database also covers approximately 479000 European trips from MERITS exchange system. Urban transport timetables</td>
<td>N L A T G R I T D E C Z</td>
<td></td>
<td>(MyCorridor beneficiary) only for MyCorridor</td>
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<tr>
<td>54</td>
<td>Infomobility Multimodal</td>
<td>N/A</td>
<td>Multimodal journey planner</td>
<td>Austrian multimodal routing by VAO: Multimodal routing including all modes of transport; dynamic routing based on real-time traffic information; real-time PT information is also included.</td>
<td>X</td>
<td>X</td>
<td>Service Provider: SRFG Service Content Owner: Verkehrsauskunft Österreich VAO GmbH</td>
<td>Priv ate with access upon MoU</td>
<td>9</td>
<td>Yes</td>
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<tr>
<td>55</td>
<td>Infomobility Public Transport</td>
<td>N/A</td>
<td>Multimodal service real time information (urban PT, ferry boat, train, interurban bus)</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>Private with access upon MoU</td>
<td>9</td>
<td>Yes</td>
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<td>MyCorridor One-Stop-Shop relevant services</td>
<td>MyCorridor Benefits services &amp; Description</td>
<td>TM 2.0 enabled</td>
<td>Availability in MyCorridor Sites</td>
<td>Service Provider / Integrator &amp; Service Content Owner</td>
<td>Terms of Use&lt;sup&gt;3&lt;/sup&gt;</td>
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<td>Available API (Yes/No)</td>
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<tr>
<td>56.</td>
<td>Infomobility Park &amp; Ride</td>
<td>N/A</td>
<td>Real-time information for parking availability and PT estimated time of arrival</td>
<td>Prague P+R Real time information for parking availability: 20+ P+R parkings availability info in json or xml format</td>
<td>X</td>
<td>Service Provider: Chaps</td>
<td>Service Content Owner: Technická správa komunikací hlavního města Prahy, a.s.</td>
<td>0/4</td>
<td>N/A</td>
<td>XM L or JSON feed&lt;sup&gt;10&lt;/sup&gt;</td>
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<tr>
<td>57.</td>
<td>Infomobility Parking</td>
<td>N/A</td>
<td>Parking info</td>
<td>Parking probabilities by TomTom: Parking probabilities dataset based on historical data which gives the probability of parking in every street and the average search-time.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Service Provider &amp; Content Owner: TomTom (MyCorridor beneficiary)</td>
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<tr>
<td>58.</td>
<td>Infomobility Parking</td>
<td>N/A</td>
<td>Parking info</td>
<td>Parking availability information</td>
<td>X</td>
<td>Service Provider: SRFG Service</td>
<td>Content by City</td>
<td>9</td>
<td>Yes (partially)</td>
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</table>

<table>
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<tr>
<td></td>
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<td>on in Salzburg: Parking availability information in the city of Salzburg.</td>
<td></td>
<td></td>
<td>Content Owner: City of Salzburg of Salzburg to SRF Group upon MoU</td>
<td></td>
<td></td>
<td>avaiabl e also as open data)</td>
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<td>59.</td>
<td>Added Value Touristic/Entertainment</td>
<td>N/A</td>
<td>POIs retrieval</td>
<td></td>
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<tr>
<td>60.</td>
<td>Added Value Touristic/Entertainment</td>
<td>N/A</td>
<td>Hotel information/recommendation/booking/ticketing</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>61.</td>
<td>Added Value Touristic/Entertainment</td>
<td>N/A</td>
<td>Push services for cultural, health, sports, touristic information/recommendation</td>
<td>Prague Zoo events: Event info in xml format</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>62.</td>
<td>Added Value Touristic/Entertainment</td>
<td>N/A</td>
<td>Push services for cultural</td>
<td>Unified configurable personal</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Will be developed by Wings in</td>
</tr>
<tr>
<td>ID</td>
<td>Service Cluster Sub-cluster</td>
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<td>MyCorridor One-Stop-Shop relevant services</td>
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<td>MyCorridor – Added added value services</td>
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<td>the Consortium – MyCorridor offering</td>
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<td>originating source</td>
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<td>in a unified way</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>63.</td>
<td>Added Value Horizontal</td>
<td>N/A</td>
<td>Eco drivin g</td>
<td>Real time service composition from available services in one-stop-shop and upon user profiling.</td>
<td>X X X X X X</td>
<td></td>
<td>Will be develope d by Wings &amp; CERTH/IT in the Consortium – MyCorridor offering</td>
<td>Only through MyCorridor</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>64.</td>
<td>Added Value Synthetic</td>
<td>To be explored</td>
<td>Synthesis of new mobility products</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Annex 7: Use Cases template

**Use Case Title:** Representative title of the Use Case. As in the above tables, i.e.: T2. Profile set-up /edit

**Use Case functional description:** Short description of the aim and main function(s) that is/are reflected through this Use Case. What this is about from the corresponding user point of view. What is the main goal accommodated.

**Lead Partner responsible:** Who is the lead partner responsible for the later implementation of this Use Case/Function (official abbreviated name).

**Other Partners responsible:** Other partners involved in the implementation.

**Relevant WP/Activity:** Name of relevant WP/Activity where this will be later implemented.

**Technologies used:** Specific technologies to be used for the later development of the use case/function.

**Prerequisites/Dependencies/Restrictions:** Denote which Use Cases are a prerequisite for this to happen and what else – apart from Use Cases – should be there to enable this happening. Restrictions and dependencies of technological/legal/regulatory or operational nature are be also mentioned here.

**Indicative interaction flow scenarios:** Description of the full interaction flow anticipated in the context of this Use Case in logical steps, from the point of view of the key actor addressed but making clear if, when and how it interacts with the other key actors and modules of the system. More than one key interaction flows may be valid.

**Connected Use Cases:** Denote which are the Use Cases that need to happen before this one happening and which are the ones that are using the output of this as their starting point.

**Benefits for key actors:** Short description of key benefits for the key actors addressed by the Use Case.

**Alternatives & extensions:** Short description of alternative flows. Also, extensions that could happen beyond MyCorridor.

**Prioritisation & discussion:** Prioritisation from Consortium and workshop experts’ point of view and final aggregated prioritisation – all justified.

**Concerns & Risks:** Short discussion of concerns and risks currently considered regarding real life implementation of this Use Case. Could be of any type; technical failures, data privacy issues, etc.

**Starting point/background & Innovation in MyCorridor:** Reference to all the existing work (if any) of the lead Partner(s) in this field, mentioning apps or other type of background knowledge. Please provide references. Make clear what is the innovation that will be targeted in MyCorridor.
## Annex 8: Key terminology

<table>
<thead>
<tr>
<th>Term</th>
<th>(current) Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MyCorridor one-stop-shop</strong></td>
<td>The one-stop-shop that will be developed in MyCorridor and will allow configuration, purchase and redemption of MaaS packages that consist of Mobility Products and supportive infomobility and added value services (upon payment of not).</td>
</tr>
<tr>
<td><strong>Mobility products</strong></td>
<td>Real life, physical transportation services or transportation management provided by private/public/public-private transport companies/authorities; they might be sold to travellers in the form of ticket products, which are based on tarrif policy. Infomobility and Added-Value services are not conceived as Mobility Products, either they are provided upon payment or not.</td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td>Digital services which can be provided through MyCorridor one-stop-shop and formulate Mobility Products. Encompassing also infomobility or Added value services.</td>
</tr>
<tr>
<td><strong>e-vouchers</strong></td>
<td>Payment receipts of Mobility Products.</td>
</tr>
<tr>
<td><strong>Mobility Tokens</strong></td>
<td>Type of vouchers concentrating smart characteristics that define the eligibility conditions for MaaS packages purchased by the traveller.</td>
</tr>
<tr>
<td><strong>Mobility/MaaS operator or MaaS aggregator or Maas Issuer</strong></td>
<td>The business holder of the one-stop-shop. See section 4 for clusters of stakeholders addressed and provisional roles.</td>
</tr>
</tbody>
</table>